

=> file reg

FILE 'REGISTRY' ENTERED AT 10:45:52 ON 08 AUG 2003  
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=> display history full l1-

FILE 'REGISTRY' ENTERED AT 09:41:31 ON 08 AUG 2003

E CARBON MONOXIDE/CN  
L1 1 SEA "CARBON MONOXIDE"/CN  
E CARBON DIOXIDE/CN  
L2 1 SEA "CARBON DIOXIDE"/CN  
L3 18816 SEA AU/ELS NOT C/ELS  
L4 304881 SEA FE/ELS NOT C/ELS

FILE 'HCA' ENTERED AT 09:47:58 ON 08 AUG 2003

L5 172927 SEA L1 OR CARBON#(2A)MONOXIDE# OR CO(2A)(GAS## OR GASIF?  
OR GASEOUS? OR ATM# OR ATMOS? OR OXIDI? OR OXIDA? OR  
OXIDN# OR INTRODUC? OR INJECT? OR APPLY? OR APPLICATION?  
OR APPLIED OR TREAT? OR PRETREAT? OR PROCESS? OR JET# OR  
NEEDL? OR SYRING? OR FLOW OR FLOWED OR FLOWING# OR  
STREAM?)  
L6 430411 SEA L2 OR CARBON#(2A)DIOXIDE# OR CO2  
L7 7748 SEA (GOLD## OR AU)(3A)(IRON# OR FE)  
L8 QUE CATALY? OR CAT#  
L9 44085 SEA L5 AND L6  
L10 27 SEA L9 AND L7  
L11 18 SEA L10 AND L8  
L12 18368 SEA L5(3A)(OXIDI? OR OXIDA? OR OXIDN#)  
L13 5216 SEA L12 AND L6  
L14 14 SEA L13 AND L7  
L15 12 SEA L14 AND L8

FILE 'REGISTRY' ENTERED AT 09:53:47 ON 08 AUG 2003

E HYDROGEN/CN  
L16 1 SEA HYDROGEN/CN  
E OXYGEN/CN  
L17 1 SEA OXYGEN/CN

FILE 'HCA' ENTERED AT 09:57:09 ON 08 AUG 2003

L18 739218 SEA L16 OR HYDROGENA? OR H2 OR (HYDROGEN# OR H)(2A)(GAS##  
OR GASIF? OR GASEOUS? OR ATM# OR ATMOS? OR OXIDI? OR  
OXIDA? OR OXIDN# OR INTRODUC? OR INJECT? OR APPLY? OR  
APPLICATION? OR APPLIED OR TREAT? OR PRETREAT? OR  
PROCESS? OR JET# OR NEEDL? OR SYRING? OR FLOW OR FLOWED  
OR FLOWING# OR STREAM?)  
L19 576443 SEA L17 OR OXYGENA? OR O2 OR (OXYGEN# OR O)(2A)(GAS## OR  
GASIF? OR GASEOUS? OR ATM# OR ATMOS? OR OXIDI? OR OXIDA?  
OR OXIDN# OR INTRODUC? OR INJECT? OR APPLY? OR APPLICATIO

N? OR APPLIED OR TREAT? OR PRETREAT? OR PROCESS? OR JET#  
OR NEEDL? OR SYRING? OR FLOW OR FLOWED OR FLOWING# OR  
STREAM?)

L20 17 SEA L10 AND (L18 OR L19)  
L21 10 SEA L14 AND (L18 OR L19)  
L22 10 SEA L10 AND L18  
L23 10 SEA L10 AND L19  
L24 5 SEA L14 AND L18  
L25 6 SEA L14 AND L19

FILE 'REGISTRY' ENTERED AT 10:00:33 ON 08 AUG 2003

L26 304881 SEA L4 OR L4  
D L26 150000 RN  
D L26 150001 RN  
L27 154881 SEA RAN=(,151552-55-5) L4 OR L4  
L28 150000 SEA RAN=(151552-56-6,) L4 OR L4

FILE 'HCA' ENTERED AT 10:07:43 ON 08 AUG 2003

L29 148240 SEA L3  
L30 853533 SEA L27 OR L28  
L31 20756 SEA L29 AND L30  
L32 157 SEA L31 AND L5 AND L6  
L33 97 SEA L32 AND L8  
L34 57 SEA L33 AND L18  
L35 36 SEA L33 AND L19  
L36 18 SEA L34 AND L35

FILE 'REGISTRY' ENTERED AT 10:10:46 ON 08 AUG 2003

L37 35 SEA (AU(L)O)/ELS (L) 2/ELC.SUB  
L38 367 SEA (FE(L)O)/ELS (L) 2/ELC.SUB

FILE 'HCA' ENTERED AT 10:13:21 ON 08 AUG 2003

L39 481 SEA L37  
L40 86422 SEA L38  
L41 1 SEA L39 AND L40 AND L5 AND L6  
L42 0 SEA L41 AND L8  
L43 1 SEA L41 AND (L18 OR L19)

FILE 'REGISTRY' ENTERED AT 10:14:16 ON 08 AUG 2003

E AU CL H/ELF  
L44 6232 SEA (AU(L)CL(L)H)/ELS  
L45 8 SEA L44 (L) 3/ELC.SUB  
L46 22 SEA L44 (L) O/ELS (L) 4/ELC.SUB  
L47 30 SEA L45 OR L46  
E IRON (III) NITRATE/CN  
E FERRIC NITRATE/CN  
L48 3 SEA "FERRIC NITRATE"/CN OR "FERRIC NITRATE HEXAHYDRATE"/C  
N OR "FERRIC NITRATE NONAHYDRATE"/CN

FILE 'HCA' ENTERED AT 10:20:18 ON 08 AUG 2003

L49 2776 SEA L47 OR HAUCL4 OR AUHCL4 OR AUCL3 (2A)HCL  
L50 8049 SEA L48 OR (IRON# OR FERRIC# OR FE) (A) (NITRATE# OR

TRINITRATE#) OR FE(W)NO3(W)3

L51 30 SEA L49 AND L50  
L52 9 SEA L51 AND (L5 OR L6)  
L53 5 SEA L52 AND (L18 OR L19)  
L54 2 SEA L51 AND L5 AND L6  
L55 2 SEA L54 AND L18  
L56 0 SEA L54 AND L19  
L57 262 SEA (L49 AND L30) OR (L50 AND L29)  
L58 32 SEA L57 AND L5  
L59 19 SEA L57 AND L6  
L60 10 SEA L58 AND L59  
L61 6 SEA L60 AND L18  
L62 0 SEA L60 AND L19  
L63 24276 SEA L7 OR ((L49 OR L39 OR L29) AND (L50 OR L40 OR L30))  
L64 1432 SEA L63 AND L19  
L65 67 SEA L64 AND L5 AND L6  
L66 37 SEA L65 AND L8  
L67 18 SEA L66 AND L18  
L68 10615 SEA L2/P  
L69 10 SEA L66 AND L68  
L70 12 SEA L65 AND L68  
L71 22 SEA L24 OR L25 OR L43 OR L41 OR L52 OR L53 OR L54 OR L55  
OR L61  
L72 36 SEA (L11 OR L14 OR L15 OR L20 OR L21 OR L22 OR L23 OR  
L60 OR L67 OR L69 OR L70) NOT L71  
L73 36 SEA (L11 OR L14 OR L15 OR L20 OR L21 OR L22 OR L23 OR  
L36 OR L60 OR L67 OR L69 OR L70) NOT L71  
L74 5 SEA L10 NOT (L71 OR L73)

=> file hca

FILE 'HCA' ENTERED AT 10:46:37 ON 08 AUG 2003

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=> d l71 1-22 cbib abs hitstr hitind

L71 ANSWER 1 OF 22 HCA COPYRIGHT 2003 ACS on STN

138:403731 Conversion of CO to CO2 using gold catalyst.

Pugach, Joseph; Hewitt, Thomas E. (Pressure Chemical Co., USA).

U.S. Pat. Appl. Publ. US 2003099586 A1 20030529, 4 pp. (English).

CODEN: USXXCO. APPLICATION: US 2001-997617 20011129.

AB Gold oxide is pptd. together with iron oxide from a soln. contg. a  
**gold** source and an **iron** source; the gel formed  
thereby is washed, dried, ground to a size range of 0.85 mm to 4.25  
mm and calcined; then used as a catalyst for **oxidizing**  
**CO** to **CO2** in the presence of a large excess of  
hydrogen.

IT 7439-89-6, Iron, uses 7440-57-5, Gold, uses

(conversion of CO to CO2 in presence of large excess of

hydrogen using gold catalyst)

RN 7439-89-6 HCA  
 CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA  
 CN Gold (8CI, 9CI) (CA INDEX NAME)

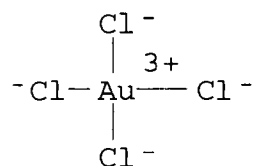
Au

IT 1333-74-0, **Hydrogen, processes**  
 (conversion of CO to CO<sub>2</sub> in presence of large  
 excess of hydrogen using gold catalyst)

RN 1333-74-0 HCA  
 CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 16903-35-8 39403-39-9, Gold oxide  
 (conversion of CO to CO<sub>2</sub> using gold catalyst)  
 RN 16903-35-8 HCA  
 CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)

H<sup>+</sup>

RN 39403-39-9 HCA  
 CN Gold oxide (9CI) (CA INDEX NAME)

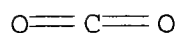
Component	Ratio	Component Registry Number
=====+=====+=====		
O	x	17778-80-2
Au	x	7440-57-5

IT 124-38-9, Carbon dioxide,  
 processes 630-08-0, Carbon  
 monoxide, processes 7782-61-8,  
 Ferric nitrate nonahydrate

(conversion of CO to CO<sub>2</sub> using gold catalyst)

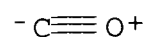
RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



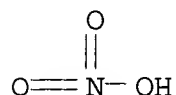
RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 7782-61-8 HCA

CN Nitric acid, iron(3+) salt, nonahydrate (9CI) (CA INDEX NAME)



① 1/3 Fe(III)

3 H<sub>2</sub>O

IC ICM B01D053-62

NCL 423247000

CC 49-10 (Industrial Inorganic Chemicals)

Section cross-reference(s): 67

ST **carbon monoxide dioxide** conversion  
gold catalyst

IT Oxidation catalysts

(conversion of CO to CO<sub>2</sub> in presence of large excess of  
hydrogen using gold catalyst)IT **7439-89-6, Iron, uses 7440-57-5, Gold, uses**(conversion of CO to CO<sub>2</sub> in presence of large excess of  
hydrogen using gold catalyst)IT **1333-74-0, Hydrogen, processes**(conversion of CO to CO<sub>2</sub> in presence of large  
excess of hydrogen using gold catalyst)

IT 1332-37-2, Iron oxide, uses

(conversion of CO to CO<sub>2</sub> using gold catalyst)IT **16903-35-8 39403-39-9, Gold oxide**(conversion of CO to CO<sub>2</sub> using gold catalyst)IT **124-38-9, Carbon dioxide,****processes** 497-19-8, Sodium carbonate, **processes**

630-08-0, Carbon monoxide,  
processes 7782-61-8, Ferric  
nitrate nonahydrate

(conversion of CO to CO<sub>2</sub> using gold catalyst)

L71 ANSWER 2 OF 22 HCA COPYRIGHT 2003 ACS on STN

138:387990 Selective **co-oxidation** in a  
**hydrogen** rich **stream** over Au/MnOx and Au/FeOx  
catalysts. Dao, T.; Luengnaruemitchai, A.; Osuwan, S.; Gulari, E.  
(The Petroleum and Petrochemical College, Chulalongkorn University,  
Bangkok, Thailand). Preprints of Symposia - American Chemical  
Society, Division of Fuel Chemistry, 48(1), 424-425 (English) 2003.  
CODEN: PSADFZ. ISSN: 1521-4648. Publisher: American Chemical  
Society, Division of Fuel Chemistry.

AB **H<sub>2</sub>** is the most suitable fuel for the fuel cell technol.  
for application to transportation. Stream reforming is an  
efficient, economical and widely-used process for **H<sub>2</sub>**  
prodn. and integration into the fuel cell unit. Also produced with  
**H<sub>2</sub>** is a small amt. of CO which poisons the Pt anodes  
reducing the overall fuel cell performance and should be removed.  
This paper focused on gold/manganese oxide catalyst (Au/MnOx) and  
gold/ferrous-oxide catalyst (Au/FeOx) for selective **oxidn.**  
of CO. XRD was used to characterized the copptd.,  
calcined catalysts, and the surface area was detd. by gas  
adsorption.

IT 1309-37-1, Iron oxide (Fe<sub>2</sub>O<sub>3</sub>), uses  
(copptd. as carbonate with gold, phase present after calcination;  
selective **co-oxidn.** in **hydrogen**  
rich **stream** over Au/MnOx and Au/FeOx catalysts)

RN 1309-37-1 HCA

CN Iron oxide (Fe<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 7440-57-5, Gold, uses  
(copptd. with manganese and iron carbonate, calcined; selective  
**co-oxidn.** in **hydrogen** rich  
**stream** over Au/MnOx and Au/FeOx catalysts)

RN 7440-57-5 HCA

CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

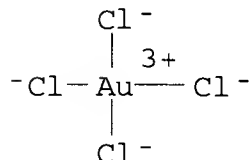
IT 124-38-9, Carbon dioxide, formation  
(nonpreparative)  
(effect on CO **oxidn.**; selective **co-**  
**oxidn.** in **hydrogen** rich **stream** over  
Au/MnOx and Au/FeOx catalysts)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

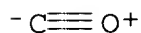
O=C=O

IT 16903-35-8, Gold hydrogen chloride (**AuHCl<sub>4</sub>**)  
 (gold precursor; selective **co-oxidn.** in  
**hydrogen** rich **stream** over Au/MnOx and Au/FeOx  
 catalysts)  
 RN 16903-35-8 HCA  
 CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)

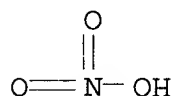


H<sup>+</sup>

IT 630-08-0, Carbon monoxide, reactions  
 (selective **co-oxidn.** in **hydrogen**  
 rich **stream** over Au/MnOx and Au/FeOx catalysts)  
 RN 630-08-0 HCA  
 CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IT 10421-48-4, Iron nitrate (Fe(  
 NO<sub>3</sub>)<sub>3</sub>)  
 (support precursor; selective **co-oxidn.** in  
**hydrogen** rich **stream** over Au/MnOx and Au/FeOx  
 catalysts)  
 RN 10421-48-4 HCA  
 CN Nitric acid, iron(3+) salt (8CI, 9CI) (CA INDEX NAME)



1/3 Fe(III)

CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 67  
 ST selective **oxidn CO hydrogen** fuel cell  
 humidity TEM XRD; copptd **gold iron** manganese  
 oxide selective oxidn catalyst

- IT Surface area  
(of catalysts; selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT Grain size  
(of gold in catalysts; selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT Fuel cells  
(selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT **Oxidation**  
**Oxidation** catalysts  
(selective; selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT 1309-37-1, Iron oxide (Fe<sub>2</sub>O<sub>3</sub>), uses 1317-35-7, Manganese oxide (Mn<sub>3</sub>O<sub>4</sub>)  
(copptd. as carbonate with gold, phase present after calcination; selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT 598-62-9P, Manganese carbonate (MnCO<sub>3</sub>)  
(copptd. phase still present after calcination; selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT 7440-57-5, Gold, uses  
(copptd. with manganese and iron carbonate, calcined; selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT 124-38-9, Carbon dioxide, formation  
(nonpreparative)  
(effect on CO **oxidn.**; selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT 7732-18-5, Water, uses  
(effect on CO **oxidn.**; selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT 16903-35-8, Gold hydrogen chloride (AuHCl<sub>4</sub>)  
(gold precursor; selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT 630-08-0, Carbon monoxide, reactions  
(selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)
- IT 497-19-8, Sodium carbonate (Na<sub>2</sub>CO<sub>3</sub>), reactions 10377-66-9, Manganese nitrate (Mn(NO<sub>3</sub>)<sub>2</sub>) 10421-48-4, Iron nitrate (Fe(NO<sub>3</sub>)<sub>3</sub>)  
(support precursor; selective **co-oxidn.** in **hydrogen** rich **stream** over Au/MnOx and Au/FeOx catalysts)



L71 ANSWER 3 OF 22 HCA COPYRIGHT 2003 ACS on STN

138:296678 Preparation, characterization and CO sensing of Au/iron oxide thin films. Neri, G.; Bonavita, A.; Galvagno, S.; Pace, C.; Donato, N. (Dipartimento di Chimica Industriale e Ingegneria dei Materiali, Universita di Messina, Messina, 98166, Italy). Journal of Materials Science: Materials in Electronics, 13(9), 561-565 (English) 2002. CODEN: JSMEEV. ISSN: 0957-4522. Publisher: Kluwer Academic Publishers.

AB The prepn. and characterization of Au-doped iron oxide thin films is reported. Doped-thin films were prepd. by a liq.-phase deposition (LPD) method from aq. solns. in the presence of a reactive atm. contg. NH<sub>3</sub>. The morphol. and microstructure of the prepd. films are described. The effect of some process parameters (precursor soln. concn., calcination temp.) on the film formation, thickness and microstructure were investigated. Sensor devices based on Au/Fe<sub>2</sub>O<sub>3</sub> thin films deposited on Al<sub>2</sub>O<sub>3</sub> by the LPD method, are sensitive to CO at operating temps. between 200-400.degree..

IT **630-08-0, Carbon monoxide**, analysis  
(prepn., characterization, and CO sensing of Au/Fe<sub>2</sub>O<sub>3</sub> thin films)

RN 630-08-0 HCA

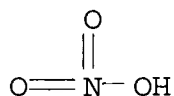
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O<sup>+</sup>

IT **10421-48-4, Ferric nitrate**  
**16903-35-8, Tetrachloroauric acid**  
(prepn., characterization, and CO sensing of Au/Fe<sub>2</sub>O<sub>3</sub> thin films)

RN 10421-48-4 HCA

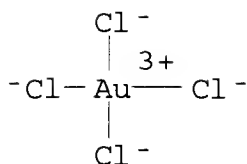
CN Nitric acid, iron(3+) salt (8CI, 9CI) (CA INDEX NAME)



1/3 Fe(III)

RN 16903-35-8 HCA

CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)

H<sup>+</sup>

*uncalcined in  
fact.*

- CC 79-2 (Inorganic Analytical Chemistry)  
Section cross-reference(s): 75
- ST gold ferric oxide film liq phase deposition microstructure;  
**carbon monoxide** gas sensor gold ferric oxide film
- IT 630-08-0, **Carbon monoxide**, analysis  
(prepn., characterization, and CO sensing of Au/Fe<sub>2</sub>O<sub>3</sub> thin films)
- IT 10421-48-4, **Ferric nitrate**  
16903-35-8, Tetrachloroauric acid  
(prepn., characterization, and CO sensing of Au/Fe<sub>2</sub>O<sub>3</sub> thin films)

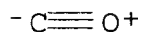
L71 ANSWER 4 OF 22 HCA COPYRIGHT 2003 ACS on STN

137:99538 Microstructural comparison of calcined and uncalcined gold/iron-oxide catalysts for low-temperature CO oxidation. Hodge, N. A.; Kiely, C. J.; Whyman, R.; Siddiqui, M. R. H.; Hutchings, G. J.; Pankhurst, Q. A.; Wagner, F. E.; Rajaram, R. R.; Golunski, S. E. (Department of Materials Science and Engineering, University of Liverpool, Merseyside, L69 3BX, UK). Catalysis Today, 72(1-2), 133-144 (English) 2002. CODEN: CATTEA. ISSN: 0920-5861. Publisher: Elsevier Science B.V..

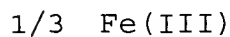
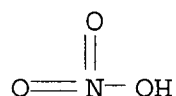
AB A series of gold/iron-oxide catalysts has been prep'd. by an inverse co-pptn. method from a mixt. of HAuCl<sub>4</sub>.cntdot.3H<sub>2</sub>O and Fe(NO<sub>3</sub>)<sub>3</sub>.cntdot.9H<sub>2</sub>O. Samples calcined at 400 .degree.C for 3 h exhibited poor activity towards CO oxidn., whereas uncalcined materials that had only been dried at 120 .degree.C for 16 h exhibited a far superior catalytic activity. The most active material of this latter type is shown to have 100% CO conversion at 20 .degree.C for at least 10 h. Detailed characterization of the dried and the calcined materials using ICP and BET anal., XRD, HREM, STEM-EDX and Mossbauer spectroscopy has shown significant differences in their microstructure. The dried materials consist of micron scale agglomerates of 4-8 nm disordered Fe<sub>5</sub>HO<sub>8</sub>.cntdot.4H<sub>2</sub>O particles on which the Au is uniformly dispersed in the form of a mixt. AuOOH.cntdot.xH<sub>2</sub>O and Au<sub>0</sub>. By comparison, the calcined materials are comprised solely of 3-5 nm cuboctahedral metallic Au particles supported on 20 nm diam. well-cryst. .alpha.-Fe<sub>2</sub>O<sub>3</sub> particles. Our microstructural observations and catalytic measurements are discussed in the context of the Bond-Thompson mixed Aux+/Au<sub>0</sub> model for the low-temp. CO oxidn. catalyst.

IT 630-08-0, Carbon monoxide, reactions  
 10421-48-4, Iron trinitrate  
 16903-35-8  
 (microstructural comparison of calcined and uncalcined  
 gold/iron-oxide catalysts for low-temp. CO  
 oxidn.)

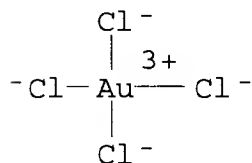
RN 630-08-0 HCA  
 CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 10421-48-4 HCA  
 CN Nitric acid, iron(3+) salt (8CI, 9CI) (CA INDEX NAME)

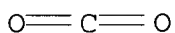


RN 16903-35-8 HCA  
 CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)

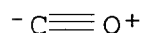


CC 67-2 (Catalysis, Reaction Kinetics, and Inorganic Reaction  
 Mechanisms)  
 Section cross-reference(s): 59  
 ST calcined gold iron oxide catalyst microstructure **carbon**  
**monoxide** oxidn; uncalcined gold iron oxide catalyst  
 microstructure **carbon monoxide** oxidn  
 IT Calcination  
 Microstructure  
 Oxidation catalysts  
 (microstructural comparison of calcined and uncalcined  
 gold/iron-oxide catalysts for low-temp. CO  
 oxidn.)

- IT 12343-96-3  
(ferrihydrite-phase; microstructural comparison of calcined and uncalcined gold/iron-oxide catalysts for low-temp. CO oxidn.)
- IT 1309-37-1, Iron-oxide( $\text{Fe}_2\text{O}_3$ ), uses 7440-57-5, Gold, uses (microstructural comparison of calcined and uncalcined gold/iron-oxide catalysts for low-temp. CO oxidn.)
- IT 30779-22-7, Gold hydroxide oxide ( $\text{Au}(\text{OH})\text{O}$ ) (microstructural comparison of calcined and uncalcined gold/iron-oxide catalysts for low-temp. CO oxidn.)
- IT 630-08-0, Carbon monoxide, reactions  
10421-48-4, Iron trinitrate  
16903-35-8  
(microstructural comparison of calcined and uncalcined gold/iron-oxide catalysts for low-temp. CO oxidn.)
- L71 ANSWER 5 OF 22 HCA COPYRIGHT 2003 ACS on STN  
136:41822 Oxidative decomposition of chlorinated hydrocarbons by glow discharge in PACT (plasma and catalyst integrated technologies) reactors. Chen, X.; Rozak, J.; Lin, J.-C.; Suib, S. L.; Hayashi, Y.; Matsumoto, H. (Department of Chemistry, University of Connecticut, Storrs, CT, 06269, USA). Applied Catalysis, A: General, 219(1-2), 25-31 (English) 2001. CODEN: ACAGE4. ISSN: 0926-860X. Publisher: Elsevier Science B.V..
- AB Oxidative decompn. of Me chloride ( $\text{CH}_3\text{Cl}$ ) and methylene chloride ( $\text{CH}_2\text{Cl}_2$ ) by glow discharge was conducted in a new type of reactor using plasma and catalyst integrated technologies (PACT) in the lab. PACT reactors with metal (Fe, Pt, Au)-coated electrodes were used in expts. at room temp. and atm. pressure. Feed compns. were 5000 ppm of  $\text{CH}_3\text{Cl}$  or  $\text{CH}_2\text{Cl}_2$  and 5%  $\text{O}_2$  with a balance of He and a total flow rate of .apprx.20 mL/min. Significant conversion (.ltoreq.90%) of  $\text{CH}_3\text{Cl}$  or  $\text{CH}_2\text{Cl}_2$  was achieved for the oxidative decompn. of  $\text{CH}_3\text{Cl}$  or  $\text{CH}_2\text{Cl}_2$  in PACT reactors.
- IT 124-38-9, Carbon dioxide, processes  
630-08-0, Carbon monoxide, processes  
(oxidative decompn. of waste gas chlorinated hydrocarbons by glow discharge in plasma and catalyst integrated technol. reactor equipped with metal-coated electrodes)
- RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



CC 59-4 (Air Pollution and Industrial Hygiene)  
Section cross-reference(s): 48, 52, 67

IT 124-38-9, **Carbon dioxide**, processes  
630-08-0, **Carbon monoxide**, processes  
7647-01-0, **Hydrogen chloride**, processes  
7732-18-5, Water, processes  
(oxidative decompn. of waste gas chlorinated hydrocarbons by glow discharge in plasma and catalyst integrated technol. reactor equipped with metal-coated electrodes)

L71 ANSWER 6 OF 22 HCA COPYRIGHT 2003 ACS on STN  
132:168574 Fischer-Tropsch processes using xerogel and aerogel catalysts. Manzer, Leo E.; Kourtakis, Konstantinos (Conoco Inc., USA). PCT Int. Appl. WO 2000010705 A1 20000302, 33 pp. DESIGNATED STATES: W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1999-US18962 19990819. PRIORITY: US 1998-97192 19980820; US 1998-97193 19980820; US 1998-97194 19980820; US 1999-377007 19990818; US 1999-377008 19990818; US 1999-376873 19990818.

AB A process is disclosed for producing hydrocarbons. The process involves contacting a feed **stream** comprising **hydrogen** and **carbon monoxide** with a catalyst in a reaction zone maintained at conversion-promoting conditions effective to produce an effluent stream comprising hydrocarbons. In accordance with this invention, the catalyst used in the process is prepd. by a method including at least (1) forming a catalyst gel by mixing (a) at least one dissolved compd. of a catalytic metal for Fischer-Tropsch reactions (e.g., iron, cobalt, nickel and/or ruthenium compd.(s) dissolved in water and/or ethanol); (b) (i) at least one dissolved alkoxide of titanium, zirconium and/or tantalum, and optionally (ii) at least one dissolved aluminum compd. (the alkoxide and aluminum components (i) and (ii) being dissolved in a non-aq. solvent); and at least when necessary to hydrolyze the alkoxide component (i) and aluminum compd. component (ii), (c) water supplement; and (2) drying the gel.

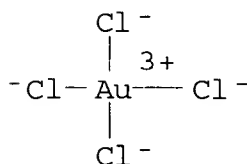
IT 7439-89-6, Iron, reactions 16903-35-8, Gold  
hydrogen chloride (**AuHCl<sub>4</sub>**)  
(Fischer-Tropsch processes using xerogel and aerogel catalysts)

RN 7439-89-6 HCA  
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

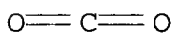
RN 16903-35-8 HCA

CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)



H<sup>+</sup>

IT 124-38-9, Carbon dioxide, uses  
(extn. fluid; Fischer-Tropsch processes using xerogel and aerogel catalysts)  
RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



IC ICM B01J021-08  
ICS C07C027-00  
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
IT 64-17-5, Ethanol, reactions 64-19-7, Acetic acid, reactions  
1314-68-7, Rhenium oxide (Re2O7) 2171-98-4, Zirconium (IV)  
isopropoxide 5593-70-4 7439-89-6, Iron, reactions  
7440-25-7D, Tantalum, alkoxides, reactions 7440-32-6D, Titanium,  
alkoxides, reactions 7440-48-4, Cobalt, reactions 7440-67-7D,  
Zirconium, alkoxides, reactions 7646-79-9, Cobalt(II)chloride,  
reactions 7647-10-1, Palladium dichloride 7697-37-2, Nitric  
acid, reactions 7718-54-9, Nickel (II) chloride, reactions  
10049-08-8, Ruthenium (III) chloride 13454-96-1, Platinum (IV)  
chloride 16903-35-8, Gold hydrogen chloride (AuHCl4)  
(Fischer-Tropsch processes using xerogel and aerogel catalysts)  
IT 75-69-4 75-71-8 124-38-9, Carbon dioxide, uses 1320-37-2 7664-41-7, Ammonia, uses  
(extn. fluid; Fischer-Tropsch processes using xerogel and aerogel catalysts)

L71 ANSWER 7 OF 22 HCA COPYRIGHT 2003 ACS on STN  
132: 154457 Method for the production of Au/Fe2O3 catalyst materials and their use in polymer electrolyte membrane fuel cells. Plzak, Vojtech (Zentrum fur Sonnenenergie- und Wasserstoff-Forschung Baden-Wurttemberg, Germany). PCT Int. Appl. WO 2000009259 A2 20000224, 14 pp. DESIGNATED STATES: W: CA, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (German). CODEN: PIXXD2. APPLICATION: WO 1999-DE2528 19990811. PRIORITY: DE 1998-19836585 19980812.

AB The invention relates to an Au/Fe<sub>2</sub>O<sub>3</sub> catalyst material comprised of a particle-shaped, co-catalytically active Fe<sub>2</sub>O<sub>3</sub> supporting material with metallic Au clusters deposited thereupon which have a diam. of less than 4.5 nm. The catalyst materials can be obtained by: (a) reacting a water-sol. Fe(III) salt in an aq. medium with a base; (b) impregnating the hydroxide gel which is formed thereby and which is still moist with a soln. of a water-sol. Au compd. in order to deposit complexed Au clusters on the surface of the hydroxide gel; (c) removing water from the suspension of the reaction product formed thereby; and (d) subjecting the dried reaction product to a calcination at temps. ranging from 350 to 700.degree.. The inventive catalyst material is esp. suited for selective low-temp. **CO oxidn.** in reformat **hydrogen** which is used as combustible gas for polymer electrolyte membrane fuel cells.

IT 1333-74-0P, Hydrogen, uses  
(method for prodn. of Au/Fe<sub>2</sub>O<sub>3</sub> catalyst materials and their use in polymer electrolyte membrane fuel cells)

RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 630-08-0, Carbon monoxide, reactions  
10421-48-4, Ferric nitrate  
16903-35-8, Tetrachloroauric acid  
(method for prodn. of Au/Fe<sub>2</sub>O<sub>3</sub> catalyst materials and their use in polymer electrolyte membrane fuel cells)

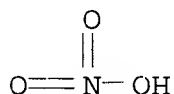
RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O<sup>+</sup>

RN 10421-48-4 HCA

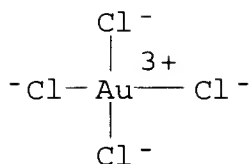
CN Nitric acid, iron(3+) salt (8CI, 9CI) (CA INDEX NAME)



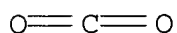
1/3 Fe(III)

RN 16903-35-8 HCA

CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)

H<sup>+</sup>

- IC ICM B01J023-00  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 59, 67  
 IT 1333-74-0P, Hydrogen, uses  
 (method for prodn. of Au/Fe<sub>2</sub>O<sub>3</sub> catalyst materials and their use  
 in polymer electrolyte membrane fuel cells)  
 IT 630-08-0, Carbon monoxide, reactions  
 10377-60-3, Magnesium nitrate 10421-48-4, Ferric  
 nitrate 16903-35-8, Tetrachloroauric acid  
 (method for prodn. of Au/Fe<sub>2</sub>O<sub>3</sub> catalyst materials and their use  
 in polymer electrolyte membrane fuel cells)
- L71 ANSWER 8 OF 22 HCA COPYRIGHT 2003 ACS on STN  
 132:199079 Method for catalytic removal of hydrogen from **carbon  
 dioxide** used for urea synthesis. An, Lidun; Hao, Zhengping  
 (Lanzhou Chemical Physics Institute, Chinese Academy of Sciences,  
 Peop. Rep. China). Faming Zhuanli Shenqing Gongkai Shuomingshu CN  
 1125638 A 19960703, 6 pp. (Chinese). CODEN: CNXXEV. APPLICATION:  
 CN 1994-120006 19941230.
- AB H<sub>2</sub> and CO are completely oxidized at  
 85-160.degree. and 27,000 h<sup>-1</sup> in the presence of catalyst with Au as  
 active component and Fe<sub>2</sub>O<sub>3</sub> or MFe<sub>2</sub>O<sub>4</sub> as carrier (M = Mg or Ni). The  
 ratio of Au and Fe is 1.0:1000-1.0:10 when the  
 carrier is Fe<sub>2</sub>O<sub>3</sub>, and the ratio of Au and M is 1.0:1000-1.0:20 when  
 the carrier is MFe<sub>2</sub>O<sub>4</sub>.
- IT 124-38-9P, Carbon dioxide, preparation  
 (method for catalytic removal of hydrogen from carbon  
 dioxide used for urea synthesis)
- RN 124-38-9 HCA  
 CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



- IT 1333-74-0, Hydrogen, processes  
 (method for catalytic removal of hydrogen from **carbon  
 dioxide** used for urea synthesis)  
 RN 1333-74-0 HCA  
 CN Hydrogen (8CI, 9CI) (CA INDEX NAME)



H-H

- IC ICM B01J023-54  
CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
Section cross-reference(s): 67  
ST **carbon dioxide hydrogen** removal  
**oxidn** catalyst; urea synthesis **carbon dioxide** hydrogen removal  
IT Oxidation catalysts  
(method for catalytic removal of hydrogen from **carbon dioxide** used for urea synthesis)  
IT 12068-86-9, Iron magnesium oxide ( $\text{Fe}_2\text{MgO}_4$ ) 12168-54-6, Iron nickel oxide ( $\text{NiFe}_2\text{O}_4$ )  
(carrier; method for catalytic removal of hydrogen from **carbon dioxide** used for urea synthesis)  
IT 7440-57-5, Gold, uses  
(method for catalytic removal of hydrogen from **carbon dioxide** used for urea synthesis)  
IT 124-38-9P, **Carbon dioxide**, preparation  
(method for catalytic removal of hydrogen from **carbon dioxide** used for urea synthesis)  
IT 630-08-0, Carbon monoxide, processes 1333-74-0, **Hydrogen, processes**  
(method for catalytic removal of hydrogen from **carbon dioxide** used for urea synthesis)  
IT 57-13-6P, Urea, preparation  
(method for catalytic removal of hydrogen from **carbon dioxide** used for urea synthesis)
- L71 ANSWER 9 OF 22 HCA COPYRIGHT 2003 ACS on STN  
131:303829 Microcalorimetry, Adsorption, and Reaction Studies of  $\text{CO}$ ,  $\text{O}_2$ , and  $\text{CO}+\text{O}_2$  over  $\text{Au}/\text{Fe}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ , and Polycrystalline Gold Catalysts. Tripathi, A. K.; Kamble, V. S.; Gupta, N. M. (Applied Chemistry Division, Bhabha Atomic Research Centre, Trombay, 400 085, India). Journal of Catalysis, 187(2), 332-342 (English) 1999. CODEN: JCTLA5. ISSN: 0021-9517. Publisher: Academic Press.
- AB To understand the effect of catalytic activity of  $\text{Au}/\text{Fe}_2\text{O}_3$  at low temps. on a  $\text{CO}$  oxidn. reaction, adsorption and changes in enthalpy were detd. for the interaction of  $\text{CO}$ ,  $\text{O}_2$ , or  $\text{CO}+\text{O}_2$  (2:1) pulses over  $\text{Au}$  (5 at.%) /  $\text{Fe}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ , and polycryst. gold catalysts between 300 and 470 K. The results demonstrate that the oxidn. of  $\text{CO}$  on both  $\text{Fe}_2\text{O}_3$  and  $\text{Au}/\text{Fe}_2\text{O}_3$  occur by means of similar redox mechanisms involving the removal and replenishment of lattice oxygen, where the presence of gold promotes these processes. The FTIR data reveal that gold facilitates the chemisorption of  $\text{CO}$  on  $\text{Au}/\text{Fe}_2\text{O}_3$ , leading predominantly to the formation of  $\text{AuO}-\text{CO}$  species. The carbonate-like species, formed on both  $\text{Fe}_2\text{O}_3$  and  $\text{Au}/\text{Fe}_2\text{O}_3$  during the adsorption of  $\text{CO}$  or  $\text{CO}+\text{O}_2$ , are stable below 375 K and are

regarded to be mere byproducts that do not play a major role in the **CO oxidn. process**, particularly at low reaction temps. (<400 K). The larger gold particles inhibited the formation of COad species during exposure of Au/Fe<sub>2</sub>O<sub>3</sub> to CO+O<sub>2</sub>; this was accompanied by a decrease in the adsorption of both CO and O<sub>2</sub> and a decrease in the formation of CO<sub>2</sub>. The promotional effect of gold is attributed to the presence of small (nanosize) Au crystallites that facilitate the chemisorption of CO mols. because of their inherent defective structural sites. It is suggested that the energy that evolves during the chemisorption of CO mols. is responsible for the surge in temp. at the Au-Fe<sub>2</sub>O<sub>3</sub> interfaces; these eventually serve as sites for the accelerated reaction between CO and the support. (c) 1999 Academic Press.

IT 7782-44-7, Oxygen, reactions  
 (microcalorimetry, adsorption, and reaction studies of CO, O<sub>2</sub>, and CO+O<sub>2</sub> over Au/Fe<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, and polycryst. gold catalysts)  
 RN 7782-44-7 HCA  
 CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

CC 67-3 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
 Section cross-reference(s): 59, 66, 69  
 ST microcalorimetry carbon monoxide oxygen **gold iron** oxide catalyst; adsorption carbon monoxide oxygen **gold iron** oxide catalyst; reaction carbon monoxide oxygen **gold iron** oxide catalyst  
 IT Adsorption  
 Chemisorption  
 Oxidation catalysts  
 Oxidation enthalpy  
 Surface reaction  
 (microcalorimetry, adsorption, and reaction studies of CO, O<sub>2</sub>, and CO+O<sub>2</sub> over Au/Fe<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, and polycryst. gold catalysts)  
 IT 1309-37-1, Iron oxide(fe<sub>2</sub>o<sub>3</sub>), uses 7439-89-6, Iron, uses (microcalorimetry, adsorption, and reaction studies of CO, O<sub>2</sub>, and CO+O<sub>2</sub> over Au/Fe<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, and polycryst. gold catalysts)  
 IT 630-08-0, Carbon monoxide, reactions 7782-44-7, Oxygen, reactions  
 (microcalorimetry, adsorption, and reaction studies of CO, O<sub>2</sub>, and CO+O<sub>2</sub> over Au/Fe<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, and polycryst. gold catalysts)

L71 ANSWER 10 OF 22 HCA COPYRIGHT 2003 ACS on STN  
 131:107360 Active oxygen species and reaction mechanism for low-temperature **CO oxidation** on an

Fe<sub>2</sub>O<sub>3</sub>-supported Au catalyst prepared from Au(PPh<sub>3</sub>)(NO<sub>3</sub>) and as-precipitated iron hydroxide. Liu, Haichao; Kozlov, Alexander I.; Kozlova, Anguelina P.; Shido, Takafumi; Iwasawa, Yasuhiro (Department of Chemistry, Graduate School of Science, The University of Tokyo, Tokyo, 113-0033, Japan). Physical Chemistry Chemical Physics, 1(11), 2851-2860 (English) 1999. CODEN: PPCPFQ. ISSN: 1463-9076. Publisher: Royal Society of Chemistry.

AB Active oxygen species and the reaction mechanism for catalytic **CO oxidn.** with O<sub>2</sub> on a highly active Fe<sub>2</sub>O<sub>3</sub>-supported Au catalyst (denoted as **Au/Fe(OH)<sub>3</sub>\***), which was prepd. by supporting Au(PPh<sub>3</sub>)(NO<sub>3</sub>) on as-pptd. wet iron hydroxide followed by calcination at 673 K, have been studied by means of oxygen isotope exchange, O<sub>2</sub>-temp. programmed desorption (TPD) and FT-IR. Surface lattice oxygen atoms on the **Au/Fe(OH)<sub>3</sub>\*** catalyst were inactive for oxygen exchange with O<sub>2</sub> and CO, and also for **CO oxidn.** at room temp. The surface lattice oxygen atoms were exchanged only with the oxygen atoms of CO<sub>2</sub> probably via carbonates. There is no evidence that O<sub>2</sub> dissocs. to at. oxygen on the catalyst. TPD spectra following adsorption of 36O<sub>2</sub> or a mixt. of 32O<sub>2</sub> + 36O<sub>2</sub> showed no oxygen exchange, where the adsorbed oxygen on **Au/Fe(OH)<sub>3</sub>\*** desorbed below 500 K. Upon CO exposure, all the adsorbed oxygen species disappeared. FT-IR spectra revealed that CO reversibly adsorbed on Au particles and irreversibly adsorbed on Fe<sup>3+</sup> sites on the **Au/Fe(OH)<sub>3</sub>\*** surface. Only CO mols. adsorbed on the Au particles were active for low-temp. **CO oxidn.** No band for adsorbed CO was obsd. on Fe<sub>2</sub>O<sub>3</sub>\* prepd. by calcination of the as-pptd. wet Fe(OH)<sub>3</sub>\* at 673 K, which indicates that the presence of Au particles causes a profound effect on the surface state of Fe-oxide. Annealing of **Au/Fe(OH)<sub>3</sub>\*** under an O<sub>2</sub> atmosphere did not suppress the catalytic **CO oxidn.**, unlike a remarkable suppression obsd. with Au/Ti(OH)<sub>4</sub>\*. The presence of water vapor did not significantly decrease the **CO oxidn.** rate due to the facile water gas shift reaction on **Au/Fe(OH)<sub>3</sub>\***, also unlike the case of Au/Ti(OH)<sub>4</sub>\*. From the systematic oxygen isotope exchange expts. along with O<sub>2</sub>-TPD and FT-IR, it is most likely that CO adsorbed on Au metallic particles and O<sub>2</sub> adsorbed on oxygen vacancies at the oxide surface adjacent to the Au particles contribute to the low-temp. catalytic **CO oxidn.** on **Au/Fe(OH)<sub>3</sub>\***. The mechanism for the catalytic **CO oxidn.** on the active **Au/Fe(OH)<sub>3</sub>\*** catalyst is discussed in detail and compared with those reported previously.

IT 7782-44-7, Oxygen, reactions  
(active oxygen species and reaction mechanism for low-temp. **CO oxidn.** on Fe<sub>2</sub>O<sub>3</sub>-supported Au catalyst prepd. from Au(PPh<sub>3</sub>)(NO<sub>3</sub>) and as-pptd. iron hydroxide)

RN 7782-44-7 HCA

CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

- CC 67-3 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
- ST active oxygen species **carbon monoxide oxidn gold iron oxide**; catalyst **gold iron oxide carbon monoxide oxidn**; mechanism **carbon monoxide oxidn gold iron oxide catalyst**
- IT Exchange reaction  
**Oxidation catalysts**  
 (active **oxygen** species and reaction mechanism for low-temp. **CO oxidn.** on Fe<sub>2</sub>O<sub>3</sub>-supported Au catalyst prepd. from Au(PPh<sub>3</sub>)(NO<sub>3</sub>) and as-pptd. iron hydroxide)
- IT 1309-37-1P, Iron oxide(Fe<sub>2</sub>O<sub>3</sub>), uses 7440-57-5P, Gold, uses (active oxygen species and reaction mechanism for low-temp. **CO oxidn.** on Fe<sub>2</sub>O<sub>3</sub>-supported Au catalyst prepd. from Au(PPh<sub>3</sub>)(NO<sub>3</sub>) and as-pptd. iron hydroxide)
- IT 630-08-0, Carbon monoxide, reactions **7782-44-7**, Oxygen, reactions 32767-18-3, reactions (active oxygen species and reaction mechanism for low-temp. **CO oxidn.** on Fe<sub>2</sub>O<sub>3</sub>-supported Au catalyst prepd. from Au(PPh<sub>3</sub>)(NO<sub>3</sub>) and as-pptd. iron hydroxide)
- IT 1309-33-7, Iron trihydroxide 14897-32-6 (active oxygen species and reaction mechanism for low-temp. **CO oxidn.** on Fe<sub>2</sub>O<sub>3</sub>-supported Au catalyst prepd. from Au(PPh<sub>3</sub>)(NO<sub>3</sub>) and as-pptd. iron hydroxide)
- L71 ANSWER 11 OF 22 HCA COPYRIGHT 2003 ACS on STN
- 131:107334 Studies on reduction of Au<sup>3+</sup> by bacteria for preparation of gold catalyst. Liu, Yueying; Fu, Jinkun; Hu, Rongzong; Yao, Bingxin; Weng, Shengzhou (Department of Biology, Xiamen University, Xiamen, 361005, Peop. Rep. China). Weishengwu Xuebao, 39(3), 260-263 (Chinese) 1999. CODEN: WSHPA8. ISSN: 0001-6209. Publisher: Kexue Chubanshe.
- AB The strain D01, screened from different source bacterial strains, has relatively strong ability of adsorbing Au<sup>3+</sup>. The strain D01 was identified as Bacillus megatherium D01 and still grew well in the medium contg. 600 mg/L Au<sup>3+</sup>. The results of electrochem. reaction indicated that the strain D01 had a strong ability of redn. It could reduce the Au<sup>3+</sup>/.alpha.-Fe<sub>2</sub>O<sub>3</sub> (precursor of the gold catalyst) to highly dispersive Au<sup>0</sup>/.alpha.-Fe<sub>2</sub>O<sub>3</sub> catalyst which could catalyze the reaction of CO + O<sub>2</sub> .fwdarw. CO<sub>2</sub>.
- IT 630-08-0, **Carbon monoxide**, reactions (oxidn. of; redn. of Au<sup>3+</sup> by bacteria for prepn. of gold catalyst)
- RN 630-08-0 HCA
- CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

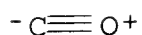
-C≡O+

IT 7782-44-7, Oxygen, reactions  
(redn. of Au<sup>3+</sup> by bacteria for prepn. of gold catalyst)  
RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)

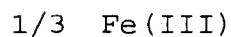
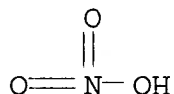
O=O

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
Section cross-reference(s): 10  
ST redn trivalent gold Bacillus megatherium D01 catalyst prepn;  
**carbon monoxide oxidn gold**  
**iron oxide catalyst**  
IT **Oxidation** catalysts  
(for CO; redn. of Au<sup>3+</sup> by bacteria for prepn. of gold catalyst)  
IT 630-08-0, **Carbon monoxide**, reactions  
(**oxidn.** of; redn. of Au<sup>3+</sup> by bacteria for prepn. of gold catalyst)  
IT 7782-44-7, Oxygen, reactions 16065-91-1, Gold(3+), reactions  
(redn. of Au<sup>3+</sup> by bacteria for prepn. of gold catalyst)

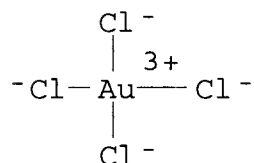
L71 ANSWER 12 OF 22 HCA COPYRIGHT 2003 ACS on STN  
127:324065 Mossbauer characterization of gold/iron oxide catalysts.  
Wagner, Friederich E.; Galvagno, Signorino; Milone, Candida; Visco, Anna M.; Stievano, Lorenzo; Calogero, Sandro (Physik Department, Technische Universitat Munchen, Garching, D-85747, Germany).  
Journal of the Chemical Society, Faraday Transactions, 93(18), 3403-3409 (English) 1997. CODEN: JCFTEV. ISSN: 0956-5000.  
Publisher: Royal Society of Chemistry.  
AB 57Fe and 197Au Moessbauer data are reported and discussed for a variety of catalysts of Au supported on Fe oxide. The 57Fe Moessbauer spectra show that Fe is present as ferrihydrite, haematite and goethite in amts. that depend on the conditions of prepn. The highest amt. of ferrihydrite is obsd. in the samples prepd. by copptn. The 197Au Moessbauer spectra reveal the formation of two main Au species, i.e., metallic Au and oxidic trivalent Au. The presence of Au favors the formation of ferrihydrite over that of haematite. No direct correlation was found between catalytic activity towards CO oxidn. and the Au species identified by Moessbauer spectroscopy, but catalyst activity increases with the relative amt. of ferrihydrite. Probably the ferrihydrite is important for activation of O<sub>2</sub>.  
IT 630-08-0, **Carbon monoxide**, processes  
(Moessbauer characterization of gold/iron oxide catalysts and their application to **carbon monoxide oxidn.**)  
RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IT 10421-48-4, Iron trinitrate  
 (Moessbauer characterization of gold/iron oxide catalysts prepd. using)  
 RN 10421-48-4 HCA  
 CN Nitric acid, iron(3+) salt (8CI, 9CI) (CA INDEX NAME)



IT 16903-35-8, Tetrachloroauric acid  
 (Mossbauer characterization of gold/iron oxide catalysts prepd. using)  
 RN 16903-35-8 HCA  
 CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)



CC 73-7 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 Section cross-reference(s): 67  
 ST Mossbauer effect gold iron oxide catalyst; oxidn catalyst  
**carbon monoxide**  
 IT Mossbauer effect  
 Oxidation  
 Oxidation catalysts  
 (Moessbauer characterization of gold/iron oxide catalysts and their application to **carbon monoxide** oxidn.)  
 IT 1332-37-2, Iron oxide, properties 7440-57-5, Gold, properties  
 (Moessbauer characterization of gold/iron oxide catalysts and their application to **carbon monoxide** oxidn.)  
 IT 1310-14-1, Goethite 1317-60-8, Haematite, occurrence 39473-89-7, Ferrihydrite

(Moessbauer characterization of gold/iron oxide catalysts and their application to **carbon monoxide** oxidn.)

IT 630-08-0, **Carbon monoxide**, processes  
(Moessbauer characterization of gold/iron oxide catalysts and their application to **carbon monoxide** oxidn.)

IT 14762-69-7, Iron-57, properties  
(Moessbauer characterization of gold/iron oxide catalysts and their application to **carbon monoxide** oxidn.)

IT 10421-48-4, **Iron trinitrate**  
(Moessbauer characterization of gold/iron oxide catalysts prepd. using)

IT 16903-35-8, Tetrachloroauric acid  
(Mossbauer characterization of gold/iron oxide catalysts prepd. using)

L71 ANSWER 13 OF 22 HCA COPYRIGHT 2003 ACS on STN  
125:36289 **Hydrogenation** method and gold/metal oxide catalysts.  
Haruta, Masatake; Sakurai, Hiroaki; Kobayashi, Tetsuhiko; Tsubota, Susumu; Ueda, Atsushi; Ando, Masanori (Agency of Industrial Science and Technology, Japan; Ministry of International Trade and Industry). U.S. US 5506273 A 19960409, 10 pp., Cont.-in-part of U.S. Ser. No. 59,317, abandoned. (English). CODEN: USXXAM.  
APPLICATION: US 1994-263234 19940621. PRIORITY: JP 1991-349706 19911206; US 1992-950125 19920924; US 1993-59317 19930511.

AB The title method for the **hydrogenation** of at least CO and CO<sub>2</sub> comprises prepg. a gaseous mixt. contg. .gtoreq.1 carbon oxide and hydrogen and contacting the mixt. with a catalyst essentially consisting of a metal oxide and gold at 150-400.degree., where the gold has a particle size <20 nm. The method is useful for synthesis of methanol and hydrocarbons.

IT 1309-37-1, Iron oxide, uses 12063-19-3, Iron zinc oxide (Fe<sub>2</sub>ZnO<sub>4</sub>)  
(**hydrogenation** method and gold/metal oxide catalysts)

RN 1309-37-1 HCA  
CN Iron oxide (Fe<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)  
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

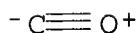
RN 12063-19-3 HCA  
CN Iron zinc oxide (Fe<sub>2</sub>ZnO<sub>4</sub>) (9CI) (CA INDEX NAME)  
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 124-38-9, **Carbon dioxide**, reactions  
630-08-0, **Carbon monoxide**, reactions  
16903-35-8, Chloroauric acid  
(**hydrogenation** method and gold/metal oxide catalysts)

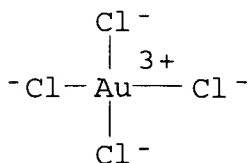
RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 16903-35-8 HCA  
 CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)



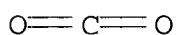
H<sup>+</sup>

IC ICM C07C027-06  
 NCL 518713000  
 CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
 ST gold **hydrogenation** catalyst particle size; metal oxide **hydrogenation** catalyst; carbon oxide **hydrogenation** gold catalyst; methanol manuf gold **hydrogenation** catalyst  
 IT **Hydrogenation** catalysts  
     (**hydrogenation** method and gold/metal oxide catalysts)  
 IT 1304-56-9, Beryllium oxide 1306-19-0, Cadmium oxide, uses 1309-37-1, Iron oxide, uses 1309-48-4, Magnesium oxide, uses 1312-81-8, Lanthanum oxide 1313-99-1, Nickel oxide, uses 1314-13-2, Zinc oxide, uses 1314-23-4, Zirconium oxide, uses 1332-29-2, Tin oxide 1344-28-1, Aluminum oxide, uses 1344-70-3, Copper oxide 7440-57-5, Gold, uses 7631-86-9, Silicon oxide, uses 11099-11-9, Vanadium oxide 11104-61-3, Cobalt oxide 11118-57-3, Chromium oxide 11129-18-3, Cerium oxide 11129-60-5, Manganese oxide 12060-08-1, Scandium oxide 12063-19-3, Iron zinc oxide (Fe<sub>2</sub>ZnO<sub>4</sub>) 12672-71-8, Indium oxide 13463-67-7, Titanium oxide, uses  
     (**hydrogenation** method and gold/metal oxide catalysts)  
 IT 67-56-1P, Methanol, preparation  
     (**hydrogenation** method and gold/metal oxide catalysts)  
 IT 124-38-9, Carbon dioxide, reactions  
     630-08-0, Carbon monoxide, reactions  
     7779-88-6, Zinc nitrate 16903-35-8, Chloroauric acid  
     (**hydrogenation** method and gold/metal oxide catalysts)  
 L71 ANSWER 14 OF 22 HCA COPYRIGHT 2003 ACS on STN  
 118:147068 Catalytic decomposition of trimethylamine over supported gold catalysts. Ueda, Atsushi; Haruta, Masatake (Gov. Ind. Res. Inst., Osaka, Ikeda, 563, Japan). Shigen Kankyo Taisaku, 28(11), 1035-8 (Japanese) 1992. CODEN: SKTAET. ISSN: 0916-9172.  
 AB The decompn. of trimethylamine on ultrafine Au catalysts has been studied. The Au ppt. was prepd. by dropping aq. soln. of



HAuCl<sub>2</sub>·4H<sub>2</sub>O and nitrate on metal onto aq. soln. of Na<sub>2</sub>CO<sub>3</sub>. Then the ppt. was washed by water, filtered, freeze-dried and calcined for 5 h at 400.degree. to produce catalyst. The Au catalyst was supported by NiFe<sub>2</sub>O<sub>4</sub>, CoFe<sub>3</sub>O<sub>4</sub>, ZnFe<sub>2</sub>O<sub>4</sub> and Fe<sub>2</sub>O<sub>3</sub>, in which at. ratio of Au to supporting metals was 1:19. The catalyst was filled into a fixed bed flow type of reactor and O<sub>2</sub>(20%)/He mixt. contg. 455 ppm of (CH<sub>3</sub>)<sub>3</sub>N was flowed through the reactor with flow rate of 2 .times. 104 h<sup>-1</sup> mL/g of catalyst. The temp. at which one half of (CH<sub>3</sub>)<sub>3</sub>N was converted to CO<sub>2</sub> ranged from 115 to 164.degree., in which the catalyst on NiFe<sub>2</sub>O<sub>4</sub> showed the lowest temp. It was also found that the support of higher CO oxidizability enabled oxidn. of (CH<sub>3</sub>)<sub>3</sub>N at lower temp. The Au/NiFe<sub>2</sub>O<sub>4</sub> catalyst showed higher oxidizability and much lower N<sub>2</sub>O productivity of (CH<sub>3</sub>)<sub>3</sub>N than Pd/Al<sub>2</sub>O<sub>3</sub> and Pt/Al<sub>2</sub>O<sub>3</sub>.

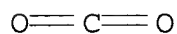
IT 124-38-9P, **Carbon dioxide**, preparation  
(formation of, in decompn. of trimethylamine over supported gold catalysts)  
RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



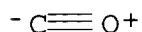
CC 22-8 (Physical Organic Chemistry)  
Section cross-reference(s): 67  
IT 124-38-9P, **Carbon dioxide**, preparation  
(formation of, in decompn. of trimethylamine over supported gold catalysts)  
IT 12052-28-7, Cobalt **iron** oxide (CoFe<sub>2</sub>O<sub>4</sub>) 12063-19-3,  
**Iron** zinc oxide (Fe<sub>2</sub>ZnO<sub>4</sub>) 12168-54-6, **Iron**  
nickel oxide (Fe<sub>2</sub>NiO<sub>4</sub>)  
(gold catalysts supported on, for trimethylamine decompn.)  
L71 ANSWER 15 OF 22 HCA COPYRIGHT 2003 ACS on STN  
117:100470 An improved gold/iron oxide (Fe<sub>2</sub>O<sub>3</sub>)  
catalyst for long life closed cycle carbon dioxide  
laser Tripathi, A. K.; Gupta, N. M.; Chatterji, U. K.; Iyer, R. M.  
(Chem. Div., Bhabha At. Res. Cent., Bombay, 400 085, India). Indian  
Journal of Technology, 30(2), 107-12 (English) 1992. CODEN: IJOTA8.  
ISSN: 0019-5669.  
AB Sealed off **carbon dioxide** lasers encounter  
problems related to fall in output power, discharge instability and  
reduced life due to electron induced dissocn. of CO<sub>2</sub>.  
Simultaneous reformation of CO<sub>2</sub> is therefore essential for  
the long life of these lasers. Using an Au/Fe<sub>2</sub>O<sub>3</sub> catalyst, it has  
been possible in the lab. to use a 30 W CW CO<sub>2</sub> laser for  
at least two weeks with a single gas fill. In the absence of the  
catalyst, the power falls to zero level within 1-4 h  
depending upon gas mixt. compn. The studies show that  
Au/Fe<sub>2</sub>O<sub>3</sub> as a laser catalyst is superior to tin oxide based  
catalysts. The studies also indicate that though the presence of CO

in large quantity may be detrimental, an optimum concn. of carbon monoxide supports CO<sub>2</sub> laser operation.

IT 124-38-9  
(lasers, **carbon dioxide**, gold-  
**iron** oxide oxidn. catalyst for long-life closed-cycle)  
RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



IT 630-08-0, **Carbon monoxide**, reactions  
(oxidn. of, catalyst for, in long life closed cycle  
**carbon dioxide** laser)  
RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



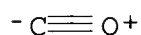
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 67  
ST **carbon dioxide** laser iron oxide catalyst; gold  
catalyst **carbon dioxide** laser  
IT Lasers  
(**carbon dioxide**, gold-iron  
oxide oxidn. catalyst for long-life closed-cycle)  
IT Oxidation catalysts  
(gold-iron oxide, for long life closed cycle  
**carbon dioxide** laser)  
IT 1309-37-1, Iron oxide (Fe<sub>2</sub>O<sub>3</sub>), uses  
(catalyst with gold, for long-life closed-cycle **carbon dioxide** laser)  
IT 7440-57-5, **Gold**, uses  
(catalysts with iron oxide, for long life closed cycle  
**carbon dioxide** laser)  
IT 124-38-9  
(lasers, **carbon dioxide**, gold-  
**iron** oxide oxidn. catalyst for long-life closed-cycle)  
IT 630-08-0, **Carbon monoxide**, reactions  
(oxidn. of, catalyst for, in long life closed cycle  
**carbon dioxide** laser)

L71 ANSWER 16 OF 22 HCA COPYRIGHT 2003 ACS on STN  
115:121186 Methods for forming oxides bearing immobilized ultrafine gold particles. Haruta, Masatake; Kobayashi, Tetsuhiko; Tsubota, Susumu; Nakahara, Yoshiko (Agency of Industrial Sciences and Technology, Japan). Ger. Offen. DE 4009111 A1 19900927, 20 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1990-4009111 19900321. PRIORITY: JP 1989-73603 19890324.  
AB The title methods entail: neutralizing an aq. soln. contg. a Au

compd., a water-sol. metal salt, and optionally .gtoreq.1 carboxylic acids or ~~carboxylic~~ acid salts by combining it with an alkali metal compd. to produce a mixed ppt.; adding .gtoreq.1 carboxylic acid compds. (if they are not already present)) and sepg. the ppt. from the liq., and heating (calcining) the ppt. Use of the materials as catalysts is indicated.

IT 630-08-0, Carbon monoxide, reactions  
1333-74-0, Hydrogen, reactions  
(oxidn. of, catalyst for, prepn. of oxides bearing immobilized gold particles as)

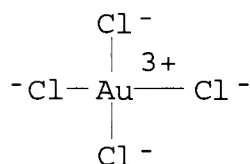
RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 1333-74-0 HCA  
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 16903-35-8  
(reaction of, in prepn. of gold particles immobilized on oxides)  
RN 16903-35-8 HCA  
CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)



H<sup>+</sup>

IC ICM B01J023-52  
ICS B01J023-66; B01J023-68  
ICA B01J037-08; C09C001-00; C09C003-00; C07C055-12; C07C059-06;  
C07C055-06; C07C059-08; C07C055-08; C07C057-145; C07C055-10;  
C07C059-235; C07C059-255; C07C059-265; G01N027-12  
CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
Section cross-reference(s): 57  
IT 50-21-5, Lactic acid, uses and miscellaneous 50-21-5D, Lactic acid, salts 68-04-2 77-92-9, Citric acid, uses and miscellaneous 77-92-9D, Citric acid, salts 79-14-1, Glycolic acid, uses and miscellaneous 79-14-1D, Glycolic acid, salts 87-69-4, uses and miscellaneous 87-69-4D, salts 110-15-6, Succinic acid, uses and

miscellaneous 110-15-6D, Succinic acid, salts 110-16-7,  
 2-Butenedioic acid (Z)-, uses and miscellaneous 110-16-7D,  
 2-Butenedioic acid (Z)-, salts 110-94-1, Pentanedioic acid  
 110-94-1D, Pentanedioic acid, salts 141-82-2, Malonic acid, uses  
 and miscellaneous 141-82-2D, Malonic acid, salts 144-62-7,  
 Oxalic acid, uses and miscellaneous 144-62-7D, Oxalic acid, salts  
 497-19-8, Sodium carbonate, uses and miscellaneous 584-08-7,  
 Potassium carbonate 640-67-5 866-81-9, Cobalt citrate 996-23-6  
 1344-67-8, Copper chloride 5908-80-5, Barium succinate  
 5908-81-6, Barium tartrate 6915-15-7D, Malic acid, salts  
 7446-70-0, Aluminum chloride, uses and miscellaneous 7646-78-8,  
 Tin chloride ( $\text{SnCl}_4$ ), uses and miscellaneous 7646-79-9, Cobalt  
 chloride, uses and miscellaneous 7646-85-7, Zinc chloride, uses  
 and miscellaneous 7647-18-9, Antimony chloride ( $\text{SbCl}_5$ )  
 7705-07-9, Titanium chloride ( $\text{TiCl}_3$ ), uses and miscellaneous  
 7718-54-9, Nickel chloride, uses and miscellaneous 7733-02-0, Zinc  
 sulfate 7773-01-5, Manganese chloride ( $\text{MnCl}_2$ ) 7779-25-1,  
 Magnesium citrate 7779-88-6, Zinc nitrate ( $\text{Zn}(\text{NO}_3)_2$ ) 7785-87-7,  
 Manganese sulfate 7786-81-4, Nickel sulfate 10031-62-6, Tin  
 sulfate 10043-01-3, Aluminum sulfate 10124-43-3 10124-44-4,  
 Copper sulfate 10124-49-9, Iron sulfate 10141-05-6, Cobalt  
 nitrate 10377-66-9, Manganese nitrate 10402-29-6, Copper nitrate  
 12040-57-2, Iron chloride 13138-45-9, Nickel nitrate 13473-90-0,  
 Aluminum nitrate ( $\text{Al}(\text{NO}_3)_3$ ) 13693-11-3, Titanium sulfate ( $\text{Ti}(\text{SO}_4)_2$ )  
 14104-77-9, **Iron nitrate** 16088-89-4  
 20328-96-5, Antimony nitrate 22465-17-4, Titanium nitrate  
 40968-90-9, Potassium tartrate 41480-79-9, Tin nitrate  
 52009-50-4 132036-01-2 135744-32-0 135744-33-1  
 (in prepn. of oxides bearing immobilized gold particles)

IT 630-08-0, **Carbon monoxide**, reactions

1333-74-0, **Hydrogen**, reactions

(oxidn. of, catalyst for, prepn. of oxides bearing  
 immobilized gold particles as)

IT 506-65-0, Gold cyanide ( $\text{AuCN}$ ) 13967-50-5 15189-51-2

~~16903-35-8~~ 127622-29-1

(reaction of, in prepn. of gold particles immobilized on oxides)

L71 ANSWER 17 OF 22 HCA COPYRIGHT 2003 ACS on STN

114:26735 Manufacture of supported catalyst for low-temperature  
 oxidation of **carbon monoxide**. Falke, Holger;  
 Strauss, Guenther (Gesellschaft zur Entwicklung von  
 Umweltschutztechnologie m.b.H. (GUTEC), Germany). Ger. Offen. DE  
 3914294 A1 19901031, 6 pp. (German). CODEN: GWXXBX. APPLICATION:  
 DE 1989-3914294 19890429.

AB The process comprises impregnating  $\text{Fe}_2\text{O}_3$ -contg., porous ceramic  
 supports with a soln. of Au compd., or coating the supports with a  
suspension of Au compd., and calcining the treated supports at  
qtoreq.200.degree.. The amt. of Au compd. applied is such that the  
 Au content of the finished product is approx. 0.01-15, preferably  
 0.05-4 wt.%. These catalysts are used for the combustion of CO at  
 .ltoreq.50.degree., esp. in admixt. with humid air, and are esp.  
 suitable for use in combustion installations, aldehyde manufg.

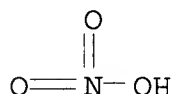
plants, combustion engines, and coal mines. Extruded, porous  $\gamma$ - $\text{Al}_2\text{O}_3$  pellets were impregnated with an  $\text{Fe}(\text{NO}_3)_3$  soln., and the impregnated pellets were dried at 120.degree., heat-treated at 400.degree., and then impregnated with a soln. contg. tetrachlorogold acid tetrahydrate 30 and  $\text{Fe}(\text{NO}_3)_3$  390 g/L, and calcined at 400.degree. to give a catalyst contg. 0.25 wt.% Au. Air (relative humidity 90%; CO content 50 ppm) was passed over the catalyst to lower the CO content to 19 ppm.

IT 10421-48-4, **Ferric nitrate**  
16903-35-8

(impregnation with iron salts and, of porous support, for low-temp. **carbon monoxide** oxidn. catalysts)

RN 10421-48-4 HCA

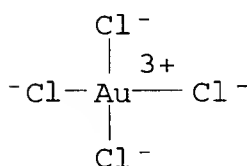
CN Nitric acid, iron(3+) salt (8CI, 9CI) (CA INDEX NAME)



1/3  $\text{Fe}(\text{III})$

RN 16903-35-8 HCA

CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)

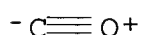


$\text{H}^+$

IT 630-08-0, **Carbon monoxide**, reactions  
(oxidn. of, low-temp., iron oxide- and gold-contg. catalysts for)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IC ICM B01J023-89

ICS C04B041-88; C10K003-04; A62B029-00

ICA B01J023-52; B01J037-02; B01J037-08; B01D053-36

- CC 49-8 (Industrial Inorganic Chemicals)  
Section cross-reference(s): 59, 67
- ST **carbon monoxide** oxidn catalyst; ferric oxide  
gold oxidn catalyst
- IT Oxidation catalysts  
(gold- and iron oxide-contg., for low-temp. **carbon monoxide** removal from air)
- IT Alkali metals, compounds  
(compds., in gold- and iron oxide-contg. low-temp. **carbon monoxide** oxidn. catalyst manuf.)
- IT Ceramic materials and wares  
(porous, .gamma.-alumina, supports, in gold- and iron-oxide-contg. low-temp. **carbon monoxide** oxidn. catalyst manuf.)
- IT 10421-48-4, **Ferric nitrate** 13453-07-1,  
Gold trichloride 16903-35-8  
(impregnation with iron salts and, of porous support, for low-temp. **carbon monoxide** oxidn. catalysts)
- IT 506-87-6, Ammonium carbonate  
(in gold- and iron oxide-contg. low-temp. **carbon monoxide** oxidn. catalyst manuf.)
- IT 1309-37-1, Iron oxide (Fe<sub>2</sub>O<sub>3</sub>), uses and miscellaneous  
(oxidn. catalyst, supports contg. gold and, for low-temp. **carbon monoxide** removal from air)
- IT 7440-57-5, Gold, uses and miscellaneous  
(oxidn. catalyst, supports contg. iron oxide and, for low-temp. **carbon monoxide** removal from air)
- IT 630-08-0, **Carbon monoxide**, reactions  
(oxidn. of, low-temp., iron oxide- and gold-contg. catalysts for)
- IT 1317-60-8, Hematite, uses and miscellaneous  
(supports, for gold catalyst, in low-temp. **carbon monoxide** oxidn. catalyst manuf.)

L71 ANSWER 18 OF 22 HCA COPYRIGHT 2003 ACS on STN

113:11477 Ultrafine gold particles immobilized on alkaline earth compounds as catalysts and sensors for combustible gases. Haruta, Masatake; Tsubota, Susumu; Kobayashi, Tetsuhiko; Nakahara, Yoshiko (Agency of Industrial Sciences and Technology, Japan). Ger. Offen. DE 3832268 A1 19890406, 19 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1988-3832268 19880922. PRIORITY: JP 1987-240515 19870924.

AB The oxidn. or redn. catalysts or combustible gas sensor can be manufd. by various methods, esp. comprising: (1) dropwise addn. of an aq. soln. of a Au compd. to an aq. soln. contg. an alk. earth compd. in which pptn. of Au(OH)<sub>3</sub> is induced on the alk. earth compd., followed by particle recovery and calcination; (2) addn. of a reducing agent to an aq. soln. contg. a dissolved Au compd. and an alk. earth compd., followed by recovery of the coppt. and its calcination; (3) addn. of CO<sub>2</sub> gas or an aq. acidic soln. to an aq. soln. causing pptn. of Au(OH)<sub>3</sub> on the alk. earth compd., followed by particle recovery and calcination; or (4) copptn. of a Au compd. and an alk. earth compd. by neutralization of an aq. soln.

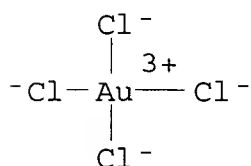
contg. these compds., followed by ppt. recovery and calcination. The alk. earth compd. is an oxide, hydroxide, carbonate, basic carbonate, nitrate, sulfate, or chloride of Be, Mg, Ca, Sr, or Ba, as well as mixed oxides of Ti, Fe, Co, or Ni.

IT 16903-35-8

(catalysts or combustible gas sensors prepd. with, and alk. earth compds.)

RN 16903-35-8 HCA

CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)



H<sup>+</sup>

IT 7439-89-6DP, Iron, oxides with alk. earth metals

(gold immobilized on, catalysts or combustible gas sensors from, manuf. of)

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

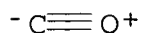
IT 630-08-0P, Carbon monoxide, reactions

1333-74-0P, Hydrogen, reactions

(oxidn. of, catalysts for, gold immobilization on alk. earth compds. as, manuf. of)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

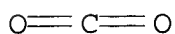
H-H

IT 124-38-9, Carbon dioxide, uses and miscellaneous

(pptn. inducing agent, for gold immobilization on alk. earth compds., in catalysts and combustible gas sensors manuf.)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



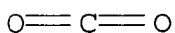
- IC ICM B01J023-66  
ICS B01J027-232; G01N027-30
- ICA B01J023-02; C10K001-34; C10K003-04; B01D053-36; H01C007-04
- CC 59-6 (Air Pollution and Industrial Hygiene)  
Section cross-reference(s): 51, 67
- IT 506-65-0, Gold cyanide (AuCN) 13682-61-6, Potassium gold chloride (KAuCl<sub>4</sub>) 13967-50-5 15189-51-2 **16903-35-8**  
127622-29-1  
(catalysts or combustible gas sensors prepd. with, and alk. earth compds.)
- IT 1304-56-9P, Beryllium oxide (BeO) 1305-62-0P, Calcium hydroxide, preparation 1309-48-4P, Magnesium oxide (MgO), preparation 1314-11-0P, Strontium oxide, preparation **7439-89-6DP**, Iron, oxides with alk. earth metals 7439-95-4DP, Magnesium, compds. 7440-02-0DP, Nickel, oxides with alk. earth metals 7440-24-6DP, Strontium, compds. 7440-32-6DP, Titanium, oxides with alk. earth metals 7440-39-3DP, Barium, compds. 7440-41-7DP, Beryllium, compds. 7440-48-4DP, Cobalt, oxides with alk. earth metals 7440-70-2DP, Calcium, compds. 10377-60-3P, Magnesium nitrate 12047-27-7P, Barium titanate, preparation 12060-59-2P, Strontium titanate 12115-66-1P 13327-32-7P, Beryllium hydroxide 13597-99-4P, Beryllium nitrate 18480-07-4P, Strontium hydroxide (gold immobilized on, catalysts or combustible gas sensors from, manuf. of)
- IT **630-08-0P, Carbon monoxide**, reactions  
**1333-74-0P, Hydrogen**, reactions  
(oxidn. of, catalysts for, gold immobilization on alk. earth compds. as, manuf. of)
- IT 64-19-7, Acetic acid, uses and miscellaneous **124-38-9, Carbon dioxide**, uses and miscellaneous  
7647-01-0, Hydrochloric acid, uses and miscellaneous 7664-93-9, Sulfuric acid, uses and miscellaneous 7697-37-2, Nitric acid, uses and miscellaneous  
(pptn. inducing agent, for gold immobilization on alk. earth compds., in catalysts and combustible gas sensors manuf.)
- L71 ANSWER 19 OF 22 HCA COPYRIGHT 2003 ACS on STN  
106:163339 Standard chemical exergy of some elements and compounds on the planet Earth. Morris, David R.; Szargut, Jan (Dep. Chem. Eng., Univ. New Brunswick, Fredericton, NB, E3B 5A3, Can.). Energy (Oxford, United Kingdom), 11(8), 733-55 (English) 1986. CODEN: ENEYDS. ISSN: 0360-5442.
- AB Values of the std. chem. exergy of 49 elements and some inorg. and org. compds. of those elements, are proposed. The values for 9 elements are based on the atm. as the ref. substance; for 27 elements, values are based on the hydrosphere as the ref. substance; for 13 elements, values are based on the lithosphere as the ref.



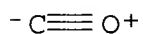
substance. Values of the std. chem. exergy of some inorg. compds. in the ideal aq. soln. of unit molarity are also presented. Amongst the compds., neg. values of the std. chem. exergy arise only for the nitrates of Ca, K and Na. These compds. should form spontaneously but formation is kinetically blocked. It is recommended that the proposed values be adopted for exergy anal. calcns.

IT 124-38-9, Carbon dioxide, properties  
 630-08-0, Carbon monoxide, properties  
 1303-58-8, Gold oxide (Au<sub>2</sub>O<sub>3</sub>) 1309-37-1, Iron  
 oxide (Fe<sub>2</sub>O<sub>3</sub>), properties 1309-38-2, Magnetite, uses and  
 miscellaneous 1317-60-8, Hematite, uses and miscellaneous  
 1333-74-0, properties 1345-25-1, Iron monoxide,  
 properties 7782-44-7, properties 12411-15-3,  
 Iron oxide (Fe<sub>2</sub>O<sub>4</sub>) 17125-56-3 107763-74-6  
 (std. chem. exergy of)

RN 124-38-9 HCA  
 CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



RN 630-08-0 HCA  
 CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 1303-58-8 HCA  
 CN Gold oxide (Au<sub>2</sub>O<sub>3</sub>) (6CI, 8CI, 9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O	3	17778-80-2
Au	2	7440-57-5

RN 1309-37-1 HCA  
 CN Iron oxide (Fe<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)  
 \*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*  
 RN 1309-38-2 HCA  
 CN Magnetite (Fe<sub>3</sub>O<sub>4</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O	4	17778-80-2
Fe	3	7439-89-6

RN 1317-60-8 HCA  
 CN Hematite (Fe<sub>2</sub>O<sub>3</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component
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		Registry Number
=====	=====	=====
O	3	17778-80-2
Fe	2	7439-89-6

RN 1333-74-0 HCA  
 CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

RN 1345-25-1 HCA  
 CN Iron oxide (FeO) (8CI, 9CI) (CA INDEX NAME)

Fe=O

RN 7782-44-7 HCA  
 CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

RN 12411-15-3 HCA  
 CN Iron oxide (FeO<sub>2</sub>) (7CI, 8CI, 9CI) (CA INDEX NAME)

O=Fe=O

RN 17125-56-3 HCA  
 CN Wustite (FeO) (9CI) (CA INDEX NAME)

Fe=O

RN 107763-74-6 HCA  
 CN Iron oxide (Fe<sub>0.950</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	1	17778-80-2
Fe	0.95	7439-89-6

CC 69-2 (Thermodynamics, Thermochemistry, and Thermal Properties)  
 Section cross-reference(s): 53

IT 50-00-0, properties 50-71-5 52-90-4, uses and miscellaneous  
 56-23-5, Carbon tetrachloride, properties 56-40-6, Aminoacetic  
 acid, properties 56-84-8, properties 57-00-1 57-10-3, Palmitic  
 acid, properties 57-13-6, Urea, properties 57-50-1, Saccharose,  
 properties 60-27-5 64-17-5, Ethyl alcohol, properties 64-18-6,  
 Formic acid, properties 64-19-7, properties 65-85-0, properties

67-56-1, Methanol, properties 67-63-0, 2-Propanol, properties  
67-64-1, Acetone, properties 68-94-0 69-65-8, Mannit 69-89-6  
69-93-2, properties 70-47-3, properties 71-41-0, Amyl alcohol,  
properties 71-43-2, Benzene, properties 73-24-5, Adenine,  
properties 73-40-5 74-82-8, Methane, properties 74-84-0,  
Ethane, properties 74-85-1, Ethylene, properties 74-86-2,  
Acetylene, properties 74-98-6, Propane, properties 74-99-7,  
Propyne 75-07-0, Acetic aldehyde, properties 75-08-1 75-15-0,  
Carbon disulfide, properties 75-18-3 75-19-4, Cyclopropane  
75-20-7, Calcium carbide 75-21-8, Ethylene oxide, properties  
75-85-4, 2-Methyl-2-butanol 85-01-8, properties 85-44-9,  
Phthalic acid anhydride 87-79-6, L-Sorbose 87-85-4 88-99-3,  
properties 91-20-3, properties 91-57-6, 2-Methylnaphthalene  
95-47-6, properties 95-93-2, 1,2,4,5-Tetramethylbenzene 96-37-7,  
Methylcyclopentane 96-41-3, Cyclopentanol 97-59-6, Allantoin  
98-00-0, Furfuryl alcohol 100-41-4, Ethylbenzene, properties  
100-51-6, properties 100-70-9, 2-Cyanopyridine 101-84-8,  
Diphenyl ether 103-65-1, n-Propylbenzene 104-51-8,  
n-Butylbenzene 104-72-3, n-Decylbenzene 106-97-8, Butane,  
properties 106-98-9, properties 107-00-6, 1-Butyne 107-03-9  
107-21-1, properties 107-92-6, properties 108-78-1, properties  
108-87-2, Methylcyclohexane 108-88-3, properties 108-93-0,  
Cyclohexanol, properties 108-95-2, properties 108-98-5, uses and  
miscellaneous 109-66-0, Pentane, properties 109-79-5 110-00-9  
110-02-1 110-15-6, properties 110-17-8, uses and miscellaneous  
110-54-3, Hexane, properties 110-66-7 110-82-7, Cyclohexane,  
properties 111-27-3, 1-Hexanol, properties 111-65-9, Octane,  
properties 111-70-6, 1-Heptanol 111-84-2, Nonane 112-40-3,  
Dodecane 115-07-1, properties 115-10-6, Dimethyl ether  
120-12-7, Anthracene, properties 122-39-4, Diphenylamine,  
properties 123-72-8, Butyl aldehyde 124-18-5, Decane  
**124-38-9, Carbon dioxide**, properties  
131-73-7 141-78-6, Ethyl acetate, properties 141-82-2, Malonic  
acid, properties 142-82-5, properties 144-55-8, Sodium  
bicarbonate, properties 144-62-7, Oxalic acid, properties  
287-23-0, Cyclobutane 302-72-7 352-93-2 409-21-2, Silicon  
carbide, properties 460-19-5, Cyanogen 461-58-5, Dicyano diamide  
463-49-0, Propadiene 471-34-1, Calcium carbonate, properties  
495-69-2 497-19-8, Sodium carbonate, properties 502-56-7,  
Dibutyl ketone 513-44-0 513-77-9, Barium carbonate 513-78-0,  
Cadmium carbonate 513-79-1, Cobalt carbonate 519-73-3,  
Triphenylmethane 534-16-7, Silver carbonate 544-76-3, Hexadecane  
546-93-0, Magnesium carbonate 554-13-2, Lithium carbonate  
554-14-3 563-71-3 584-08-7, Potassium carbonate 584-09-8,  
Rubidium carbonate 592-41-6, uses and miscellaneous 592-76-7  
593-45-3, n-Octadecane 598-62-9, Manganese carbonate 598-63-0,  
Lead carbonate 608-66-2 612-00-0, 1,1-Diphenylethane 612-71-5,  
1,3,5-Triphenylbenzene 616-44-4 624-89-5 628-71-7, 1-Heptyne  
629-05-0, 1-Octyne 629-19-6 629-50-5, Tridecane 629-59-4,  
Tetradecane 629-62-9, Pentadecane **630-08-0**,  
**Carbon monoxide**, properties 630-76-2,  
Tetraphenylmethane 693-02-7, 1-Hexyne 700-12-9,

Pentamethylbenzene 1111-78-0 1120-21-4, Undecane 1184-64-1  
 1299-86-1, Aluminum carbide ( $\text{Al}_4\text{C}_3$ ) 1302-42-7, Aluminum sodium  
 oxide ( $\text{AlNaO}_2$ ) 1302-54-1 1302-64-3, Adularia 1302-74-5,  
 .alpha.-Corundum, properties 1302-76-7, Kyanite 1302-81-4,  
 Aluminum sulfide ( $\text{Al}_2\text{S}_3$ ) 1303-28-2, Arsenic oxide ( $\text{As}_2\text{O}_5$ )  
**1303-58-8**, Gold oxide ( $\text{Au}_2\text{O}_3$ ) 1303-86-2, Boron oxide  
 ( $\text{B}_2\text{O}_3$ ), properties 1304-28-5, Barium monoxide, properties  
 1304-29-6, Barium dioxide 1304-76-3, Bismuth oxide ( $\text{Bi}_2\text{O}_3$ ),  
 properties 1305-62-0, Calcium hydroxide, properties 1305-78-8,  
 Calcium oxide, properties 1306-19-0, Cadmium oxide, properties  
 1306-23-6, Cadmium sulfide, properties 1307-96-6, uses and  
 miscellaneous 1308-06-1, Cobalt oxide ( $\text{Co}_3\text{O}_4$ ) 1308-38-9,  
 Chromium oxide ( $\text{Cr}_2\text{O}_3$ ), properties 1309-33-7 1309-36-0, Pyrite,  
 uses and miscellaneous **1309-37-1**, Iron oxide ( $\text{Fe}_2\text{O}_3$ ),  
 properties **1309-38-2**, Magnetite, uses and miscellaneous  
 1309-42-8, Magnesium hydroxide 1309-48-4, Magnesium oxide,  
 properties 1309-60-0, Lead dioxide 1309-64-4, Antimony oxide  
 ( $\text{Sb}_2\text{O}_3$ ), properties 1310-58-3, Potassium hydroxide, properties  
 1310-65-2, Lithium hydroxide 1310-73-2, properties 1312-73-8,  
 Potassium sulfide 1313-13-9, Manganese dioxide, properties  
 1313-27-5, Molybdenum trioxide, properties 1313-59-3, Sodium  
 oxide, properties 1313-82-2, Sodium sulfide, properties  
 1313-99-1, Nickel oxide, properties 1314-11-0, Strontium oxide,  
 properties 1314-13-2, Zinc oxide, properties 1314-34-7, Vanadium  
 oxide ( $\text{V}_2\text{O}_3$ ) 1314-35-8, Tungsten trioxide, properties 1314-41-6  
 1314-60-9, Antimony oxide ( $\text{Sb}_2\text{O}_5$ ) 1314-62-1, Vanadium oxide  
 ( $\text{V}_2\text{O}_5$ ), properties 1314-87-0, Lead sulfide 1314-95-0, Tin  
 monosulfide 1314-96-1, Strontium sulfide 1314-98-3, Zinc  
 sulfide, properties 1315-01-1, Tin disulfide 1317-33-5,  
 Molybdenum sulfide ( $\text{MoS}_2$ ), properties 1317-34-6, Manganese oxide  
 ( $\text{Mn}_2\text{O}_3$ ) 1317-35-7, Manganese oxide ( $\text{Mn}_3\text{O}_4$ ) 1317-36-8, Lead  
 monoxide, properties 1317-37-9, Iron sulfide ( $\text{FeS}$ ) 1317-38-0,  
 Cupric oxide, properties 1317-39-1, Cuprous oxide, properties  
 1317-40-4, Cupric sulfide 1317-42-6, Cobalt sulfide  
**1317-60-8**, Hematite, uses and miscellaneous 1318-10-1,  
 Analcime 1318-23-6 1318-74-7, Kaolinite, properties 1332-81-6,  
 Antimony oxide ( $\text{Sb}_2\text{O}_4$ ) **1333-74-0**, properties 1344-28-1,  
 Alumina, properties 1344-43-0, Manganese monoxide, properties  
 1344-54-3, Titanium oxide ( $\text{Ti}_2\text{O}_3$ ) 1344-57-6, Uranium dioxide,  
 properties 1344-58-7, Uranium trioxide 1344-59-8, Uranium oxide  
 ( $\text{U}_3\text{O}_8$ ) 1345-07-9, Bismuth sulfide ( $\text{Bi}_2\text{S}_3$ ) **1345-25-1**,  
 Iron monoxide, properties 1633-05-2, Strontium carbonate  
 1678-91-7, Ethylcyclohexane 1678-92-8, Propylcyclohexane  
 1678-93-9, Butylcyclohexane 2074-87-5 2229-07-4, Methyl  
 2465-56-7, Methylene 3333-67-3, Nickel carbonate 3452-09-3,  
 1-Nonyne 3486-35-9, Zinc carbonate 3646-73-9,  
 .alpha.-D-Galactose 3877-15-4 5965-66-2, .beta.-Lactose  
 5989-81-1, .alpha.-Lactose monohydrate 6484-52-2, Ammonium  
 nitrate, properties 6834-92-0, Sodium silicate ( $\text{Na}_2\text{SiO}_3$ )  
 6893-26-1 7429-90-5, Aluminum, properties 7439-89-6, Iron,  
 properties 7439-90-9, Krypton, properties 7439-92-1, Lead,  
 properties 7439-93-2, Lithium, properties

(std. chem. exergy of)

IT 7439-95-4, Magnesium, properties 7439-96-5, properties  
 7439-97-6, Mercury, properties 7439-98-7, Molybdenum, properties  
 7440-01-9, Neon, properties 7440-02-0, Nickel, properties  
 7440-09-7, Potassium, uses and miscellaneous 7440-17-7, Rubidium,  
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 properties 7440-31-5, Tin, properties 7440-32-6, Titanium,  
 properties 7440-33-7, Tungsten, properties 7440-36-0, Antimony,  
 properties 7440-37-1, Argon, properties 7440-38-2, Arsenic,  
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 Chromium, uses and miscellaneous 7440-48-4, Cobalt, properties  
 7440-50-8, Copper, properties 7440-57-5, Gold, properties  
 7440-59-7, Helium, properties 7440-61-1, Uranium, properties  
 7440-62-2, Vanadium, properties 7440-63-3, Xenon, properties  
 7440-66-6, Zinc, properties 7440-69-9, Bismuth, properties  
 7440-70-2, Calcium, properties 7446-09-5, Sulfur dioxide,  
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 7447-39-4, Cupric chloride, properties 7447-40-7, Potassium  
 chloride, properties 7447-41-8, Lithium chloride, properties  
 7487-88-9, Magnesium sulfate, properties 7487-94-7, properties  
 7553-56-2, uses and miscellaneous 7631-86-9, Silicon dioxide,  
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 Cobalt chloride, uses and miscellaneous 7646-85-7, Zinc chloride,  
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 Sodium chloride, properties 7647-17-8, Cesium chloride, properties  
 7664-38-2, Phosphoric acid, properties 7664-39-3, Hydrogen  
 fluoride, properties 7664-41-7, Ammonia, properties 7664-93-9,  
 Sulfuric acid, properties 7681-82-5, Sodium iodide, properties  
 7697-37-2, Nitric acid, properties 7704-34-9, Sulfur, properties  
 7705-08-0, Iron trichloride, properties 7718-54-9, properties  
 7720-78-7 7723-14-0, Phosphorus, uses and miscellaneous  
 7726-95-6, Bromine, properties 7727-37-9, properties 7727-43-7,  
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 sulfate 7757-79-1, Potassium nitrate, properties 7757-82-6,  
 Sodium sulfate, properties 7757-83-7, Sodium sulfite 7757-87-1,  
 Magnesium phosphate ( $\text{Mg}_3(\text{PO}_4)_2$ ) 7758-87-4, Calcium phosphate  
 ( $\text{Ca}_3(\text{PO}_4)_2$ ) 7758-94-3, Iron dichloride 7758-95-4, Lead chloride  
 7758-98-7, Cupric sulfate, properties 7759-00-4, Manganese  
 silicate ( $\text{MnSiO}_3$ ) 7759-02-6, Strontium sulfate 7761-88-8, Silver  
 nitrate, properties 7772-99-8, Tin dichloride, properties  
 7773-01-5, Manganese chloride 7775-41-9, Silver fluoride  
 7778-18-9 7778-80-5, Potassium sulfate, properties 7782-39-0,  
 Deuterium, properties 7782-40-3, Diamond, properties 7782-41-4,  
 Fluorine, properties 7782-42-5, Graphite, properties  
 7782-44-7, properties 7782-49-2, Selenium, properties  
 7782-50-5, Chlorine mol., properties 7783-06-4, Hydrogen sulfide,  
 properties 7783-20-2, Ammonium sulfate, properties 7783-35-9,  
 Mercury sulfate ( $\text{HgSO}_4$ ) 7783-36-0, Mercury sulfate ( $\text{Hg}_2\text{SO}_4$ )

7783-90-6, Silver chloride, properties 7785-87-7, Manganese sulfate 7786-30-3, Magnesium chloride, properties 7786-81-4, Nickel sulfate 7787-32-8, Barium fluoride 7789-18-6, Cesium nitrate 7789-20-0, Water-d2 7789-23-3, Potassium fluoride 7789-75-5, Calcium fluoride, properties 7791-11-9, Rubidium chloride, properties 10006-28-7, Potassium silicate ( $K_2SiO_3$ ) 10024-97-2, Nitrogen oxide ( $N_2O$ ), properties 10025-73-7, Chromium trichloride 10025-93-1, Uranium trichloride 10026-04-7, Silicon tetrachloride 10026-10-5, Uranium tetrachloride 10028-15-6, Ozone, uses and miscellaneous 10034-76-1, Calcium sulfate hemihydrate 10034-77-2, Calcium silicate ( $Ca_2SiO_4$ ) 10034-94-3 10043-01-3, Aluminum sulfate ( $Al_2(SO_4)_3$ ) 10043-52-4, Calcium chloride, properties 10049-05-5, Chromium dichloride 10099-76-0, Lead silicate ( $PbSiO_3$ ) 10101-39-0 10101-41-4, Calcium sulfate dihydrate 10101-97-0, Nickel sulfate hexahydrate 10102-03-1, Nitrogen pentoxide 10102-43-9, Nitrogen monoxide, properties 10102-44-0, Nitrogen dioxide, properties 10108-64-2, Cadmium chloride 10112-91-1, Mercury chloride ( $Hg_2Cl_2$ ) 10117-38-1 10124-36-4, Cadmium sulfate 10124-37-5, Calcium nitrate 10124-43-3 10179-73-4 10294-26-5, Silver sulfate ( $Ag_2SO_4$ ) 10294-29-8, Gold monochloride 10294-54-9, Cesium sulfate 10361-37-2, Barium chloride, properties 10377-48-7, Lithium sulfate 10377-60-3, Magnesium nitrate 10476-85-4, Strontium chloride 10544-72-6, Nitrogen tetroxide 11113-75-0, Nickel sulfide 12003-55-3 12004-88-5 12005-57-1 12011-67-5, Iron carbide ( $Fe_3C$ ) 12012-02-1, Nickel carbide ( $Ni_3C$ ) 12012-35-0, Chromium carbide ( $Cr_3C_2$ ) 12013-33-1, Calcium iron oxide ( $CaFe_2O_4$ ) 12018-79-0, Copper iron oxide ( $CuFe_2O_4$ ) 12022-71-8, Iron titanium oxide ( $FeTiO_3$ ) 12022-95-6, Iron silicide ( $FeSi$ ) 12032-36-9, Magnesium sulfide 12032-52-9 12033-33-9, Molybdenum sulfide ( $Mo_2S_3$ ) 12035-72-2, Nickel sulfide ( $Ni_3S_2$ ) 12035-98-2, Vanadium monoxide 12036-21-4, Vanadium dioxide 12036-22-5, Tungsten dioxide 12039-13-3, Titanium disulfide 12042-68-1 12042-78-3 12054-48-7 12063-10-4 12063-19-3, Iron zinc oxide ( $Fe_2ZnO_4$ ) 12065-65-5, Titanium oxide ( $Ti_3O_5$ ) 12068-51-8, Aluminum magnesium oxide ( $Al_2MgO_4$ ) 12068-56-3 12068-77-8, Iron chromium oxide ( $FeCr_2O_4$ ) 12068-85-8 12068-86-9, Magnesium iron oxide ( $MgFe_2O_4$ ) 12069-89-5, Molybdenum carbide ( $Mo_2C$ ) 12070-08-5, Titanium carbide 12070-10-9, Vanadium carbide 12070-12-1, Tungsten carbide (WC) 12075-40-0, Chromium carbide ( $Cr_7C_3$ ) 12125-02-9, Ammonium chloride, properties 12136-45-7, uses and miscellaneous 12137-20-1, Titanium oxide ( $TiO$ ) 12138-09-9, Tungsten disulfide 12141-45-6, Sillimanite 12141-46-7, Aluminum silicate ( $Al_2SiO_5$ ) 12168-80-8 12168-85-3, Calcium silicate ( $Ca_3SiO_5$ ) 12169-28-7, Sphalerite 12183-80-1, Andalusite 12244-10-9 12263-17-1 12313-51-8 12385-13-6, Hydrogen atomic, properties 12411-15-3, Iron oxide ( $Fe_2O_4$ ) 12428-46-5 12653-71-3, Mercury oxide 12672-51-4, Cobalt hydroxide 12777-96-7, Manganese carbide 13397-24-5, Gypsum, properties 13453-07-1, Gold trichloride 13463-67-7, uses and miscellaneous 13470-21-8, Uranium pentachloride 13472-30-5, Sodium silicate ( $Na_4SiO_4$ ) 13477-20-8, Cadmium sulfate monohydrate 13478-48-3 13566-17-1,

Lead silicate ( $\text{Pb}_2\text{SiO}_4$ ) 13597-65-4 13759-10-9, Silicon disulfide 13776-74-4, Magnesium silicate ( $\text{MgSiO}_3$ ) 13870-28-5 13918-37-1, Fayalite 13983-17-0 14464-46-1, Cristobalite 14476-16-5, Siderite 14567-73-8, Tremolite 14720-21-9, Gold trifluoride 14762-49-3, Gibbsite 14791-73-2, Aragonite 14798-04-0, Anhydrite 14940-63-7, Water-d 15293-69-3, Erythrite 16389-88-1, properties 16752-60-6, Phosphorus oxide ( $\text{P}_4\text{O}_{10}$ ) 17125-56-3 17194-00-2, Barium hydroxide 17599-81-4, Cuprous sulfate 17778-80-2, Oxygen atomic, properties 18088-11-4, Rubidium oxide 18282-10-5, Tin dioxide 18820-29-6, Manganese sulfide 18868-43-4, Molybdenum dioxide 18933-05-6, Manganese hydroxide 19783-14-3, Lead hydroxide 20281-00-9, Cesium oxide ( $\text{Cs}_2\text{O}$ ) 20427-58-1, Zinc hydroxide 20427-59-2, Cupric hydroxide 20548-54-3, Calcium sulfide 20667-12-3, Silver oxide ( $\text{Ag}_2\text{O}$ ) 21041-95-2, Cadmium hydroxide 21109-95-5, Barium sulfide ( $\text{BaS}$ ) 21548-73-2, Silver sulfide ( $\text{Ag}_2\text{S}$ ) 21645-51-2, Aluminum oxide ( $\text{Al}_2\text{O}_3$ ) trihydrate, properties 21651-19-4, Tin monoxide 22205-45-4, Cuprous sulfide 22537-15-1, Chlorine atomic, properties 24623-77-6

(std. chem. exergy of)

IT 25455-73-6, Silver oxide ( $\text{Ag}_2\text{O}$ ) 25666-97-1, Chrysolite 29656-58-4, Hydroxybenzoic acid 35592-05-3 36653-82-4, Cetyl alcohol 37251-50-6, Mercury sulfide 37342-39-5 41050-31-1, Pentadiene 50968-00-8, Mercury carbonate 58024-12-7, .beta.-Maltose monohydrate 60676-86-0, Vitreous silica 67196-82-1 107763-74-6

(std. chem. exergy of)

L71 ANSWER 20 OF 22 HCA COPYRIGHT 2003 ACS on STN

65:85980 Original Reference No. 65:16115g-h,16116a-b Kinetic and mechanism of homogeneous catalytic activation of **carbon**

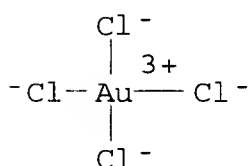
monoxide in solutions. III. Catalytic activity of transition-metal compounds. Markov, V. D.; Fasman, A. B. Zhurnal Fizicheskoi Khimii, 40(7), 1564-70 (Russian) 1966. CODEN: ZFKHA9. ISSN: 0044-4537.

AB cf. CA 63, 1243b; 65 15183b. Cheaper and more active catalysts were sought for the redn. of strong **oxidizers** by **CO**.

$\text{Cr}^{2+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Cu}^{2+}$ , and p-benzoquinone in 0.25M  $\text{H}_2\text{SO}_4$ , 0.2M  $\text{HCl}$ , and  $\text{HOAc}$  were reduced at 30.degree. in the presence of 0.25 g. catalyst per l. The solns. were agitated at 380 rpm.  $\text{Sc}^{3+}$ ,  $\text{Ti}^{4+}$ ,  $\text{V}^{5+}$ ,  $\text{Cr}^{6+}$ ,  $\text{Cr}^{3+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Fe}^{2+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Co}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Cu}^{+}$ ,  $\text{Y}^{3+}$ ,  $\text{Zr}^{4+}$ ,  $\text{Nb}^{5+}$ ,  $\text{Mo}^{6+}$ ,  $\text{La}^{3+}$ ,  $\text{Ce}^{3+}$ ,  $\text{Pr}^{3+}$ ,  $\text{Nd}^{3+}$ ,  $\text{Sm}^{3+}$ ,  $\text{Eu}^{3+}$ ,  $\text{Gd}^{3+}$ ,  $\text{Dy}^{3+}$ ,  $\text{Ho}^{3+}$ ,  $\text{Er}^{3+}$ ,  $\text{Tm}^{3+}$ ,  $\text{Yb}^{3+}$ ,  $\text{Lu}^{3+}$ ,  $\text{Hf}^{4+}$ ,  $\text{Ta}^{5+}$ ,  $\text{W}^{6+}$ ,  $\text{Re}^{7+}$ ,  $\text{Th}^{4+}$ ,  $\text{U}^{6+}$ ,  $\text{Li}^{+}$ ,  $\text{Be}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Al}^{3+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Ga}^{3+}$ ,  $\text{Ge}^{4+}$ ,  $\text{As}^{5+}$ ,  $\text{Se}^{6+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Cd}^{2+}$ ,  $\text{In}^{3+}$ ,  $\text{Sn}^{4+}$ ,  $\text{Sn}^{2+}$ ,  $\text{Sb}^{5+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Tl}^{+}$ ,  $\text{Pb}^{2+}$  were found to be inactive. Catalytic redn. of strong oxidizers proceeds only in the presence of complex compds. of the Pt-group metals. The  $\text{Ag(I)}$  activity reported in literature was not confirmed. Kinetic and potential curves of  $\text{K}_2\text{Cr}_2\text{O}_7$  redn. in 0.15M  $\text{HClO}_4$  in the presence of  $[\text{RuCl}_5\text{OH}]^{2-}$ ,  $[\text{RhCl}_6]^{3-}$ , and  $[\text{IrCl}_6]^{2-}$  were analogous to those obtained with  $\text{Pd(II)}$ . The mechanism of homogeneous activation of **CO** by transition-metal ions consists in **introducing CO**

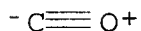
into the inner sphere of the complex, which is the rate-controlling factor, and subsequent hydrolysis of the carbonyl compn. resulting in the formation of CO<sub>2</sub> and redn. of the metal. The activities expressed in ml. CO oxidized per min. were: 0.39 (Mn<sup>7+</sup> in KMnO<sub>4</sub>), 0.10 [Cu<sup>2+</sup> in CuBr<sub>2</sub>.Cu(CH<sub>3</sub>COO)<sub>2</sub>], 0.25 [Ru<sup>4+</sup> in H<sub>2</sub>(RuCl<sub>5</sub>OH)], 0.10 and 0.33 [Rh<sup>3+</sup> in H<sub>3</sub>(RhCl<sub>6</sub>)], 19.60, 8.40, and 2.94 [Pd<sup>2+</sup> in H<sub>2</sub>(PdBr<sub>4</sub>), H<sub>2</sub>(PdCl<sub>4</sub>), and K<sub>2</sub>[Pd(NO<sub>2</sub>)<sub>4</sub>], resp.], 0.06 [Os<sup>4+</sup> in K<sub>2</sub>(OsCl<sub>6</sub>)], 0.06 Ir<sup>4+</sup> in K<sub>2</sub>(IrCl<sub>6</sub>)], 0.15 [Pt<sup>4+</sup> in H<sub>2</sub>(PtCl<sub>6</sub>)], 0.85 [Au<sup>3+</sup> in H(AuCl<sub>4</sub>)]. Low oxidn. rates were found with Ce<sup>4+</sup> and Hg<sup>2+</sup> ions. Small amts. of LiBr increased the rate of reactions catalyzed by Rh(IV), Pt(IV), Ru(IV), Ir(IV), and Os(IV). The mechanism of catalysis by Hg(II) consists in **introducing CO** between Hg<sup>2+</sup> ion and the oriented H<sub>2</sub>O mol.

IT 16903-35-8, Hydrogen tetrachloroaurate(III)  
(catalysts, in redn. of dichromate by CO)  
RN 16903-35-8 HCA  
CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)



H<sup>+</sup>

IT 630-08-0, Carbon monoxide  
(oxidizing agent (strong) redn. by, transition metal catalyst in, kinetics of)  
RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IT 7439-89-6, Iron  
(redn. of, by CO catalyzed by transition metal ions, kinetics of)  
RN 7439-89-6 HCA  
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

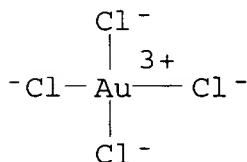
Fe

CC 5 (Catalysis and Reaction Kinetics)  
IT Platinum metals  
Transition metals  
(catalysts, in redn. of strong oxidizing agents by



CO)

- IT Catalysts and Catalysis  
(in redn., of strong **oxidizing** agents by CO,  
transition metals as)
- IT Reaction kinetics and(or) Velocity  
(of redn., of strong **oxidizing** agents by CO  
catalyzed by transition metals)
- IT 13844-89-8, Potassium tetranitropalladate(II),  $K_2[Pd(NO_2)_4]$   
16903-35-8, Hydrogen tetrachloroaurate(III) 16941-12-1,  
Hydrogen hexachloroplatinate(IV) 16970-53-9, Hydrogen  
hydroxypentachlororuthenate(IV) 16970-55-1, Hydrogen  
tetrachloropalladate(II)  
(catalysts, in redn. of dichromate by CO)
- IT 630-08-0, **Carbon monoxide**  
(oxidizing agent (strong) redn. by, transition metal catalyst in,  
kinetics of)
- IT 106-51-4, p-Benzoquinone 7439-89-6, Iron  
(redn. of, by CO catalyzed by transition metal ions, kinetics of)
- L71 ANSWER 21 OF 22 HCA COPYRIGHT 2003 ACS on STN  
65:54306 Original Reference No. 65:10117e-f Chemistry of the "molecular  
plating" process. Proksch, E.; Getoff, N.; Bildstein, H. (Inst.  
Chem. Reaktorzentrum, Seibersdorf, Austria). Allgem. Prakt. Chem.,  
17(6), 376-81 (German) 1966.
- AB In the title process, the nature of the deposit formed with  
different metallic salts was investigated by using ir spectroscopy  
and gas chromatography. In a no. of cases the ir spectrum contained  
bands in addn. to that of the salt. Thus the deposit obtained with  
 $NaNO_3$  in iso-BuOH showed bands due to  $Na_2CO_3$  and  $NaOH$  also. The gas  
chromatographic analysis of the gases formed during electrolysis in  
 $Me_2CO$  were mainly H and O and in some cases CO,  $CO_2$ , and  
 $CH_4$  were also formed. The results confirm the earlier conclusion  
(CA 63, 9401c) that the deposit does not consist solely of the  
electrolyte.
- IT 16903-35-8, Hydrogen tetrachloroaurate(III)  
(electrodeposition of, codeposition of impurities in)
- RN 16903-35-8 HCA
- CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)

● H<sup>+</sup>

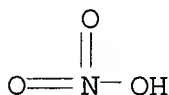
- IT 10421-48-4, Iron nitrate, Fe(

NO3) 3

(electrodeposition of, codeposition of impurities in attempted)

RN 10421-48-4 HCA

CN Nitric acid, iron(3+) salt (8CI, 9CI) (CA INDEX NAME)



1/3 Fe(III)

CC 15 (Electrochemistry)

IT 16903-35-8, Hydrogen tetrachloroaurate(III)

(electrodeposition of, codeposition of impurities in)

IT 10421-48-4, Iron nitrate, Fe(

NO3) 3

(electrodeposition of, codeposition of impurities in attempted)

IT 11115-92-7, Iron hydroxide oxide

(formation of, in attempted electrodeposition of Fe(

NO3) 3)

L71 ANSWER 22 OF 22 HCA COPYRIGHT 2003 ACS on STN

29:35883 Original Reference No. 29:4659i,4660a-b The effect of a metal surface on the kinetics of oxidation of ethane. Andreev, E. A. Doklady Akademii Nauk SSSR, Seriya A, 1, 610-13 (in English 613-15) (Unavailable) 1935. CODEN: DASABO. ISSN: 0366-8630.

AB An upper limit for the combustion of a stoichiometric mixt. of C<sub>2</sub>H<sub>6</sub> and O<sub>2</sub> in a quartz vessel was detd., and a region of combustion with 3 limits in the temp. range 610-654.degree. was established. Metal wire such as Au, Fe or Cu, introduced into the vessel increased the induction period and raised the combustion limit. Expts. made with initial pressures of 61 and 91 mm., with and without Au wire, differed markedly. The results are explained by assuming that the oxidation of hydrocarbons is divided into 2 steps. The 1st involves formation of H<sub>2</sub>O and intermediate products such as CO, aldehydes and acids. The 2nd step is conversion of CO and other intermediates into CO<sub>2</sub> and H<sub>2</sub>O. The oxidation of CO goes smoothly on the surface of the vessel and upon the wire, but the homogeneous oxidation is explosive. Increase of pressure or introduction of metal wire increases the velocity of both stages, but the 2nd more than the 1st. The explosion of CO is connected with the intermediates formed in the 1st stage which provide a no. of centers of oxidation. The nature of these products was not detd.

CC 2 (General and Physical Chemistry)

=&gt; d 173 1-36 cbib abs hitstr hitind

L73 ANSWER 1 OF 36 HCA COPYRIGHT 2003 ACS on STN

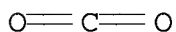
138:238546 Production of alkyl chloroformate-free dialkyl carbonates  
used in preparation of polycarbonates. Boden, Eugene Pauling;  
Fernandez, Ignacio Vic (USA). U.S. Pat. Appl. Publ. US 2003055199  
A1 20030320; 21 pp., Cont.-in-part of U.S. Ser. No. 682,285.  
(English). CODEN: USXXCO. APPLICATION: US 2001-682284 20010814.  
PRIORITY: US 2001-682285 20010814; US 2001-682286 20010814.

AB Prodn. of a dialkyl carbonate comprises reacting an alc., oxygen,  
**carbon monoxide**, and a **catalyst** to form  
a mixt. comprising a dialkyl carbonate, an alkyl chloroformate,  
hydrochloric acid, water, **carbon dioxide**, and  
**carbon monoxide**, and removing alkyl chloroformate  
from the mixt. Alkyl chloroformate impurities are shown to slowly  
decomp. to yield hydrochloric acid and cause corrosion of downstream  
sections of dialkyl carbonate manufg. equipment. The invention  
method reduces corrosion by phys. removing or chem. decomp. the  
alkyl chloroformate impurities within the corrosion-resistant  
upstream sections of the process line. The alkyl chloroformate-free  
dialkyl carbonates produced by the method are intermediates in  
manufg. diaryl carbonates and polycarbonates.

IT **124-38-9P, Carbon dioxide**, preparation  
(prodn. of alkyl chloroformate-free dialkyl carbonates used in  
prepn. of polycarbonates)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



IT **7439-89-6, Iron**, uses **7440-57-5, Gold**, uses  
(prodn. of alkyl chloroformate-free dialkyl carbonates used in  
prepn. of polycarbonates)

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA

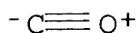
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

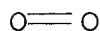
IT **630-08-0, Carbon monoxide**, reactions  
**7782-44-7, Oxygen**, reactions  
(prodn. of alkyl chloroformate-free dialkyl carbonates used in  
prepn. of polycarbonates)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)



IC ICM C08G064-00  
NCL 528196000  
CC 35-2 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 48  
IT Carbonylation  
Carbonylation **catalysts**  
(oxidative; prodn. of alkyl chloroformate-free dialkyl carbonates  
used in prepn. of polycarbonates)  
IT **124-38-9P, Carbon dioxide**, preparation  
(prodn. of alkyl chloroformate-free dialkyl carbonates used in  
prepn. of polycarbonates)  
IT 7439-88-5, Iridium, uses **7439-89-6**, Iron, uses  
7439-97-6, Mercury, uses 7440-02-0, Nickel, uses 7440-04-2,  
Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum,  
uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium, uses  
7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses 7440-43-9,  
Cadmium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses  
**7440-57-5**, Gold, uses 7440-66-6, Zinc, uses 16887-00-6,  
Chloride ion, uses  
(prodn. of alkyl chloroformate-free dialkyl carbonates used in  
prepn. of polycarbonates)  
IT 67-56-1, Methanol, reactions **630-08-0, Carbon**  
**monoxide**, reactions **7782-44-7**, Oxygen, reactions  
(prodn. of alkyl chloroformate-free dialkyl carbonates used in  
prepn. of polycarbonates)  
L73 ANSWER 2 OF 36 HCA COPYRIGHT 2003 ACS on STN  
138:189792 Method for the manufacture of dialkyl carbonates, their use  
in the manufacture of polycarbonates and corrosion prevention by  
removal of alkyl chloroformate and its byproducts. Boden, Eugene  
Pauling; Vic Fernandez, Ignacio (General Electric Company, USA).  
PCT Int. Appl. WO 2003016258 A1 20030227, 43 pp. DESIGNATED STATES:  
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM,  
HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT,  
LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO,  
RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN,  
YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF,  
BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT,  
LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN:  
PIXXD2. APPLICATION: WO 2002-US24731 20020801. PRIORITY: US  
2001-682284 20010814.  
AB Unexpected corrosion of the downstream section of a dialkyl

carbonate (e.g., di-Me carbonate) manufg. app. has been traced to alkyl chloroformate impurities, which slowly decomp. to yield hydrochloric acid. A process and app. are presented for dialkyl carbonate synthesis which reduces app. corrosion by phys. removing or chem. decompg. the alkyl chloroformate (e.g., Me chloroformate) impurities within the corrosion-resistant upstream sections of the app.

IT 7439-89-6, Iron, processes 7440-57-5, Gold,  
processes  
(**catalysts** for the manuf. of dialkyl carbonates)

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA

CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 124-38-9P, **Carbon dioxide**, preparation  
(method for the manuf. of dialkyl carbonates and their use in the  
manuf. of polycarbonates and corrosion prevention by removal of  
alkyl chloroformate and its byproducts)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

IT 630-08-0, **Carbon monoxide**, reactions  
(method for the manuf. of dialkyl carbonates and their use in the  
manuf. of polycarbonates and corrosion prevention by removal of  
alkyl chloroformate and its byproducts)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O+

IT 7782-44-7, **Oxygen**, reactions  
(method for the manuf. of dialkyl carbonates and their use in the  
manuf. of polycarbonates and corrosion prevention by removal of  
alkyl chloroformate and its byproducts)

RN 7782-44-7 HCA

CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

- IC ICM C07C068-00  
ICS C07C068-08; C07C069-96
- CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
Section cross-reference(s): 23, 35, 48
- IT 7439-88-5, Iridium, processes **7439-89-6**, Iron, processes  
7439-97-6, Mercury, processes 7440-02-0, Nickel, processes  
7440-04-2, Osmium, processes 7440-05-3, Palladium, processes  
7440-06-4, Platinum, processes 7440-15-5, Rhenium, processes  
7440-16-6, Rhodium, processes 7440-18-8, Ruthenium, processes  
7440-22-4, Silver, processes 7440-43-9, Cadmium, processes  
7440-48-4, Cobalt, processes 7440-50-8, Copper, processes  
**7440-57-5**, Gold, processes 7440-66-6, Zinc, processes  
16887-00-6, Chloride ion, processes  
(**catalysts** for the manuf. of dialkyl carbonates)
- IT **124-38-9P**, **Carbon dioxide**, preparation  
7647-01-0P, Hydrogen chloride, preparation  
(method for the manuf. of dialkyl carbonates and their use in the  
manuf. of polycarbonates and corrosion prevention by removal of  
alkyl chloroformate and its byproducts)
- IT 67-56-1, Methanol, reactions 110-96-3, Diisobutylamine  
**630-08-0**, **Carbon monoxide**, reactions  
(method for the manuf. of dialkyl carbonates and their use in the  
manuf. of polycarbonates and corrosion prevention by removal of  
alkyl chloroformate and its byproducts)
- IT **7782-44-7**, Oxygen, reactions  
(method for the manuf. of dialkyl carbonates and their use in the  
manuf. of polycarbonates and corrosion prevention by removal of  
alkyl chloroformate and its byproducts)
- L73 ANSWER 3 OF 36 HCA COPYRIGHT 2003 ACS on STN  
138:108779 **Oxygen**-assisted water **gas** shift reactor  
having a supported **catalyst**, and method for its use. Zhu,  
Tianli; Silver, Ronald G.; Emerson, Sean C.; Bellows, Richard J.  
(USA). U.S. Pat. Appl. Publ. US 2003026747 A1 20030206, 10 pp.  
(English). CODEN: USXXCO. APPLICATION: US 2001-919290 20010731.
- AB A shift converter, or reactor, in a fuel processing subsystem, as  
for a fuel cell, uses an improved catalyst bed and the  
addn. of oxygen to reduce the amt. of carbon  
monoxide in a process gas stream. The catalyst of  
bed is a metal, preferably a noble metal, having a promoted support  
of metal oxide, preferably ceria and/or zirconia. A water gas shift  
reaction converts carbon monoxide to  
carbon dioxide. The oxygen may be  
introduced as air, and causes an improvement in  
carbon monoxide removal. Use of the added oxygen  
enables the shift reactor and its catalyst bed to be  
relatively more compact for performing a given level of  
carbon monoxide conversion. The catalyst  
bed obviates the requirement for prior reducing of catalysts  
, and minimizes the need to protect the catalyst from  
oxygen during operation and/or shutdown.
- IT **7439-89-6**, Iron, uses **7440-57-5**, Gold, uses

(**oxygen**-assisted water **gas** shift reactor  
having supported **catalyst**, and method for its use)

RN 7439-89-6 HCA  
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA  
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 1333-74-0P, **Hydrogen, processes**  
(**oxygen**-assisted water **gas** shift reactor  
having supported **catalyst**, and method for its use)  
RN 1333-74-0 HCA  
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 124-38-9, **Carbon dioxide,**  
**processes 630-08-0, Carbon**  
**monoxide, processes 7782-44-7,**  
**Oxygen, processes**  
(**oxygen**-assisted water **gas** shift reactor  
having supported **catalyst**, and method for its use)  
RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O+

RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

IC ICM B01J008-04  
NCL 422190000  
CC 47-1 (Apparatus and Plant Equipment)  
Section cross-reference(s): 49, 52  
ST **oxygen** assisted water **gas** shift reactor

- supported **catalyst**  
 IT **Catalyst** supports  
 Fuel cells  
   **Oxidation**  
   Reactors  
   Water **gas** shift reaction  
   Water gas shift reaction **catalysts**  
     (**oxygen**-assisted water **gas** shift reactor  
       having supported **catalyst**, and method for its use)  
 IT Noble metals  
   Oxides (inorganic), uses  
   Platinum-group metals  
     (**oxygen**-assisted water **gas** shift reactor  
       having supported **catalyst**, and method for its use)  
 IT 1314-23-4, Zirconium oxide (ZrO<sub>2</sub>), uses **7439-89-6**, Iron,  
   uses **7439-96-5**, Manganese, uses **7440-02-0**, Nickel, uses  
   **7440-05-3**, Palladium, uses **7440-06-4**, Platinum, uses **7440-16-6**,  
   Rhodium, uses **7440-47-3**, Chromium, uses **7440-48-4**, Cobalt, uses  
   **7440-57-5**, Gold, uses **11129-18-3**, Cerium oxide  
     (**oxygen**-assisted water **gas** shift reactor  
       having supported **catalyst**, and method for its use)  
 IT **1333-74-0P, Hydrogen, processes**  
   (**oxygen**-assisted water **gas** shift reactor  
     having supported **catalyst**, and method for its use)  
 IT **124-38-9, Carbon dioxide,**  
   **processes 630-08-0, Carbon**  
   **monoxide, processes 7732-18-5, Water,**  
   **processes 7782-44-7, Oxygen,**  
   **processes**  
     (**oxygen**-assisted water **gas** shift reactor  
       having supported **catalyst**, and method for its use)
- L73 ANSWER 4 OF 36 HCA COPYRIGHT 2003 ACS on STN  
 137:313083 Method of generating hydrogen by catalytic  
 decomposition of water. Balachandran, Uthamalingam; Dorris, Stephen  
 E.; Bose, Arun C.; Stiegel, Gary J.; Lee, Tae-hyun (Argonne National  
 Laboratory, USA). U.S. US 6468499 B1 20021022, 13 pp. (English).  
 CODEN: USXXAM. APPLICATION: US 2000-590460 20000609.
- AB Hydrogen is produced by **catalytic** decompn. of a feed  
 stream comprising water using at least one proton conducting  
 membrane adapted to interact with the feed stream; splitting the  
 water into hydrogen and oxygen at a predetd. temp.; and sepg. the  
 hydrogen from the oxygen. Preferably the proton conducting membrane  
 comprises a proton conductor and a second phase material.  
 Preferable proton conductors suitable for use in a proton conducting  
 membrane include a lanthanide element, a Group VIA element and a  
 Group IA or Group IIA element such as barium, strontium, or  
 combinations of these elements. More preferred proton conductors  
include yttrium. Preferable second phase materials include  
 platinum, palladium, nickel, cobalt, chromium, manganese, vanadium,  
 silver, gold, copper, rhodium, ruthenium, niobium, zirconium,  
 tantalum, and combinations of these. More preferably second phase



materials suitable for use in a proton conducting membrane include nickel, palladium, and combinations of these. The method for generating hydrogen is preferably preformed in the range between .apprx.600.degree.. and 1,700.degree..

IT 7782-44-7, **Oxygen, processes**  
(method of generating hydrogen by **catalytic** decompn. of water)  
RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

IT 1333-74-0P, **Hydrogen, preparation**  
(method of generating hydrogen by **catalytic** decompn. of water)  
RN 1333-74-0 HCA  
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 124-38-9, **Carbon dioxide**, miscellaneous  
630-08-0, **Carbon monoxide**, miscellaneous  
(method of generating hydrogen by **catalytic** decompn. of water)  
RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O+

IT 7439-89-6, **Iron**, uses 7440-57-5, **Gold**, uses  
(second phase material; method of generating hydrogen by **catalytic** decompn. of water)  
RN 7439-89-6 HCA  
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA  
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IC ICM C01B003-08  
NCL 423657000  
CC 49-1 (Industrial Inorganic Chemicals)  
ST hydrogen generation water **catalytic** decompn proton  
conducting membrane  
IT Coal gas  
Combustion gases  
Decomposition **catalysts**  
Sintering  
Synthesis gas  
(method of generating hydrogen by **catalytic** decompn. of  
water)  
IT Alkali metals, uses  
Alkaline earth metals  
Group VIA elements  
Rare earth metals, uses  
(method of generating hydrogen by **catalytic** decompn. of  
water)  
IT Membranes, nonbiological  
(proton conducting; method of generating hydrogen by  
**catalytic** decompn. of water)  
IT Ionic conductivity  
(proton; method of generating hydrogen by **catalytic**  
decompn. of water)  
IT 7440-24-6, Strontium, uses 7440-39-3, Barium, uses 7440-45-1,  
Cerium, uses 7440-65-5, Yttrium, uses  
(method of generating hydrogen by **catalytic** decompn. of  
water)  
IT **7782-44-7, Oxygen, processes**  
(method of generating hydrogen by **catalytic** decompn. of  
water)  
IT **1333-74-0P, Hydrogen, preparation**  
(method of generating hydrogen by **catalytic** decompn. of  
water)  
IT 143312-53-2P, Barium cerium yttrium oxide ( $\text{BaCe}_{0.8}\text{Y}_{0.2}\text{O}_3$ )  
(method of generating hydrogen by **catalytic** decompn. of  
water)  
IT **124-38-9, Carbon dioxide**, miscellaneous  
**630-08-0, Carbon monoxide**, miscellaneous  
(method of generating hydrogen by **catalytic** decompn. of  
water)  
IT 513-77-9, Barium carbonate ( $\text{BaCO}_3$ ) 1306-38-3, Cerium oxide ( $\text{CeO}_2$ ),  
reactions 1314-36-9, Yttrium oxide ( $\text{Y}_2\text{O}_3$ ), reactions 7732-18-5,  
Water, reactions  
(method of generating hydrogen by **catalytic** decompn. of  
water)  
IT 7440-37-1, Argon, uses  
(method of generating hydrogen by **catalytic** decompn. of  
water)  
IT **7439-89-6, Iron**, uses 7439-96-5, Manganese, uses  
7440-03-1, Niobium, uses 7440-05-3, Palladium, uses 7440-06-4,

Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses 7440-25-7, Tantalum, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7440-62-2, Vanadium, uses 7440-67-7, Zirconium, uses

(second phase material; method of generating hydrogen by **catalytic** decompn. of water)

IT 7440-02-0, Nickel, uses  
(second phase material; method of generating hydrogen by **catalytic** decompn. of water)

L73 ANSWER 5 OF 36 HCA COPYRIGHT 2003 ACS on STN

137:281654 Fuel processor and method for generating hydrogen for fuel cells. Ahmed, Shabbir; Lee, Sheldon; Carter, John; Krumpelt, Michael (University of Chicago, USA). PCT Int. Appl. WO 2002076883 A1 20021003, 50 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-US4685 20020207. PRIORITY: US 2001-816676 20010323.

AB A method of producing a H<sub>2</sub> rich gas stream includes supplying an O<sub>2</sub> rich gas, steam, and fuel to an inner reforming zone of a fuel processor that includes a partial oxidn. **catalyst** and a steam reforming **catalyst** or a combined partial oxidn. and steam reforming **catalyst**. The method also includes contacting the O<sub>2</sub> rich gas, steam, and fuel with the partial oxidn. **catalyst** and the steam reforming **catalyst** or the combined partial oxidn. and steam reforming **catalyst** in the inner reforming zone to generate a hot reformat stream. The method still further includes cooling the hot reformat stream in a cooling zone to produce a cooled reformat stream. Addnl., the method includes removing sulfur-contg. compds. from the cooled reformat stream by contacting the cooled reformat stream with a sulfur removal agent. The method still further includes contacting the cooled reformat stream with a **catalyst** that converts water and **carbon monoxide** to **carbon dioxide** and H<sub>2</sub> in a water-gas-shift zone to produce a final reformat stream in the fuel processor.

IT 7439-89-6, Iron, uses 7440-57-5, Gold, uses  
(fuel processor and method for generating hydrogen for fuel cells)

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA  
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 1333-74-0P, **Hydrogen**, preparation  
(fuel **processor** and method for generating hydrogen for  
fuel cells)

RN 1333-74-0 HCA  
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IC ICM C01B003-32  
ICS C01B003-38; C01B003-48; C01B003-58; B01J008-04; C01B003-40  
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)

IT **Catalyst** supports  
Fuel cells  
Steam reforming **catalysts**  
Water gas shift reaction **catalysts**  
(fuel processor and method for generating hydrogen for fuel  
cells)

IT Oxidation **catalysts**  
(partial; fuel processor and method for generating hydrogen for  
fuel cells)

IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses  
7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4,  
Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium,  
uses 7440-22-4, Silver, uses 7440-48-4, Cobalt, uses  
7440-50-8, Copper, uses 7440-57-5, Gold, uses  
12160-53-1, Gallium lanthanum oxide (GaLaO<sub>3</sub>) 12597-68-1, Stainless  
steel, uses  
(fuel processor and method for generating hydrogen for fuel  
cells)

IT 1333-74-0P, **Hydrogen**, preparation  
(fuel **processor** and method for generating hydrogen for  
fuel cells)

IT 1306-38-3, Ceria, uses  
(gadolinium-doped, **catalyst** support; fuel processor and  
method for generating hydrogen for fuel cells)

L73 ANSWER 6 OF 36 HCA COPYRIGHT 2003 ACS on STN

137:265379 Generation of hydrogen by fuel reforming for fuel cells.

Ahmed, Shabbir; Krumpeit, Michael (University of Chicago, USA). PCT  
Int. Appl. WO 2002076882 A2 20021003, 26 pp. DESIGNATED STATES: W:  
AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO,  
CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR,  
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU,  
LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU,

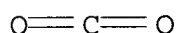
SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-US3690 20020207. PRIORITY: US 2001-816694 20010323.

AB A **H2**-rich gas is generated by reforming a fuel mixt. consisting of mol. oxygen (air), fuel, and water in the presence of an autothermally reforming **catalyst** at 400-700.degree.C. The fuel can be methane, natural gas, propane, ethanol, liquefied petroleum gas, gasoline, kerosene, and diesel. The **catalyst** contains a transition metal, such as Pt, Pd, Ru, Rh, Ir, Fe, Co, Ni, Cu, Ag, or Au and an oxide ion-conducting ceramic material crystd. in a fluorite structure or LaGaO3. The obtained **H2**-rich gas is brought into contact with a second **catalyst** to convert CO and H2O into CO2 and H2. The second **catalyst** consists of a transition metal, such as Pt, Pd, Ni, Ir, Rh, Co, Cu, Ag, Au, Ru, or Fe, on ceria or ceria doped with a rare earth or alk. earth element, such as Gd, Sm, Y, La, Pr, Mg, Ca, Sr, or Ba.

IT 124-38-9, Carbon dioxide, formation  
(nonpreparative)  
(generation of hydrogen by fuel reforming for fuel cells)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



IT 1333-74-0P, Hydrogen, preparation  
(generation of hydrogen by fuel reforming for fuel cells)

RN 1333-74-0 HCA

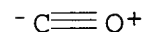
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)



IT 630-08-0, Carbon monoxide, reactions  
(generation of hydrogen by fuel reforming for fuel cells)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B003-02

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 52, 67

ST hydrogen manuf hydrocarbon fuel reforming **catalyst** fuel cell

IT Diesel fuel  
Fuel cells

Reforming **catalysts**

(generation of hydrogen by fuel reforming for fuel cells)

IT 124-38-9, **Carbon dioxide**, formation  
(nonpreparative)

(generation of hydrogen by fuel reforming for fuel cells)

IT 1333-74-0P, Hydrogen, preparation

(generation of hydrogen by fuel reforming for fuel cells)

IT 630-08-0, **Carbon monoxide**, reactions

7732-18-5, Water, reactions

(generation of hydrogen by fuel reforming for fuel cells)

L73 ANSWER 7 OF 36 HCA COPYRIGHT 2003 ACS on STN

137:203007 ~~Oxidation of solid materials in absence of molecular oxygen.~~  
Piccoli, Valerio; Rossini, Stefano; Sanfilippo, Domenico; Paggini, Alberto (Snamprogetti S.p.A., Italy). Ital. Appl. IT 2000MI0550 A1 20010917, 17 pp. (Italian). CODEN: ITXXCZ. APPLICATION: IT 2000-MI550 20000317.AB A procedure is disclosed for oxidn. of solids (e.g., molybdates and/or vanadates) in absence of mol. **O2**. The process involves (1) oxidn. of the molybdates and/or vanadates by extn. of **O2** from from an O carrier (e.g., **CO2**, **NOx**, **SOx**, **H2O**) at 250-600.degree. and optionally (2) oxidn. of a suitable reduced substrate (e.g., **H2**, **CO**, C1-30 hydrocarbons) by depleting **O2** from the oxidized solids with a simultaneous conversion of the latter to their reduced state. The process is suitable for (1) oxidative dehydrogenation for olefin manuf., (2) selective partial oxidn. for prodn. of oxidized compds., (3) total oxidn. for generation of elec. energy by combustion, and (4) manuf. of **H2** and **COx**. The oxidative dehydrogenation for olefin manuf. is carried out at a **CO2**/alkane ratio of (0.1-0.5):1, 300-550.degree., .ltoreq.10 atm, and space velocity of (200-1,000)/h. The oxidn. of hydrocarbons for manuf. of **H2** and **COx** is carried out at a **H2O**/alkane ratio of (0.1-4):1, 400-600.degree., .ltoreq.5 atm, and a space velocity of (100-500)/h.

IT 7440-57-5, Gold, uses

(activator for oxidn. of molybdate and/or vanadate

**catalyst** in absence of mol. oxygen)

RN 7440-57-5 HCA

CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 1333-74-0P, Hydrogen, preparation

(manuf. by oxidn. in absence of mol. oxygen)

RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 13718-70-2, Iron molybdate (**FeMoO4**) 37220-08-9,

Iron vanadate

(**oxidn.** in absence of mol. oxygen)

RN 13718-70-2 HCA

CN Iron molybdenum oxide (FeMoO<sub>4</sub>) (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 37220-08-9 HCA

CN Iron vanadium oxide (9CI) (CA INDEX NAME)

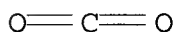
Component	Ratio	Component Registry Number
=====	=====	=====
O	x	17778-80-2
V	x	7440-62-2
Fe	x	7439-89-6

IT 124-38-9, Carbon dioxide, uses

(**oxygen** carrier for **oxidn.** in absence of mol.  
oxygen)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



IC ICM C07C

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
Section cross-reference(s): 49, 67

ST **oxidn** mol **oxygen** absence; olefin manuf oxidative  
dehydrogenation alkane; hydrogen carbon oxide manuf alkane oxidn

IT Oxidation **catalysts**

(molybdates and/or vanadates for **oxidn.** in absence of mol.  
oxygen)

IT Water vapor

(**oxygen** carrier for **oxidn.** in absence of mol.  
oxygen)

IT 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6,  
Rhodium, uses 7440-57-5, Gold, uses

(activator for **oxidn.** of molybdate and/or vanadate  
**catalyst** in absence of mol. oxygen)

IT 1333-74-0P, Hydrogen, preparation

(manuf. by **oxidn.** in absence of mol. oxygen)

IT 11113-58-9, Cobalt vanadate 13454-70-1, Cerium molybdate  
(Ce<sub>2</sub>(MoO<sub>4</sub>)<sub>3</sub>) 13718-70-2, Iron molybdate (FeMoO<sub>4</sub>)

13762-14-6, Cobalt molybdate (CoMoO<sub>4</sub>) 14013-15-1, Manganese  
molybdate (MnMoO<sub>4</sub>) 14177-55-0, Nickel molybdate (NiMoO<sub>4</sub>)

15586-37-5, Chromium molybdate (Cr<sub>2</sub>(MoO<sub>4</sub>)<sub>3</sub>) 37220-08-9,

Iron vanadate 39318-26-8, Chromium vanadium oxide 109371-81-5,

Nickel vanadium oxide 151474-27-0, Cobalt molybdenum nickel oxide  
(Co,Ni)MoO<sub>4</sub>)

(**oxidn.** in absence of mol. oxygen)

IT 124-38-9, Carbon dioxide, uses

7446-09-5, Sulfur dioxide, uses 7446-11-9, Sulfur trioxide, uses

7732-18-5, Water, uses 11104-93-1, Nitrogen oxide, uses  
(~~oxygen~~ carrier for **oxidn.** in absence of mol.  
~~oxygen~~)

L73 ANSWER 8 OF 36 HCA COPYRIGHT 2003 ACS on STN

136:318508 Method for improved detection of **carbon monoxide** by infrared absorption spectroscopy. Kirby, Kevin W.; Phelps, Amanda C.; Schwartz, Robert N. (HRL Laboratories, LLC, USA). PCT Int. Appl. WO 2002033382 A2 20020425, 22 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US28701 20010913. PRIORITY: US 2000-691793 20001018.

AB A method for detecting the presence and amt. of **carbon monoxide**, comprising the use of IR spectroscopy to compare the spectra of the test gas contg. **carbon monoxide** and the ref. gas. The ref. gas is the test gas from which **carbon monoxide** had been removed by conversion using **catalysts**. The presence and quantity of **carbon monoxide** is detd. by deducting the spectrum of the ref. gas from the spectrum of the test gas. The **catalysts** comprise nanoparticles of gold pptd. on a metal oxide or hydroxide carrier. An app. implementing this method is described.

IT 124-38-9, Carbon dioxide, analysis  
1333-74-0, Hydrogen, analysis 7782-44-7, Oxygen, analysis  
(method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)

RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

RN 1333-74-0 HCA  
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)



O=O

IT 630-08-0, Carbon monoxide, analysis  
 (method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)  
 RN 630-08-0 HCA  
 CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O+

IT 7440-57-5, Gold, uses 11113-66-9, Iron hydroxide  
 (method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)  
 RN 7440-57-5 HCA  
 CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

RN 11113-66-9 HCA  
 CN Iron hydroxide (9CI) (CA INDEX NAME)

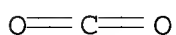
Component	Ratio	Component Registry Number
HO	x	14280-30-9
Fe	x	7439-89-6

IC ICM G01N021-35  
 CC 79-6 (Inorganic Analytical Chemistry)  
 Section cross-reference(s): 52  
 ST **carbon monoxide** IR absorption spectroscopy  
 IT Standard substances, analytical  
 (gaseous; method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)  
 IT Calibration  
 Fuel cells  
 Gas analysis  
 IR spectrometers  
 IR spectroscopy  
 Reduction **catalysts**  
 Water vapor  
 (method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)  
 IT Hydroxides (inorganic)

- Oxides (inorganic), uses  
(method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)
- IT Humidity  
(relative; method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)
- IT 124-38-9, **Carbon dioxide**, analysis  
1333-74-0, Hydrogen, analysis 7727-37-9, Nitrogen, analysis 7782-44-7, Oxygen, analysis  
(method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)
- IT 630-08-0, **Carbon monoxide**, analysis  
(method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)
- IT 1309-42-8, Magnesium hydroxide 1313-99-1, Nickel oxide, uses  
1332-37-2, Iron oxide, uses 1344-28-1, Alumina, uses 1344-70-3, Copper oxide 7440-57-5, Gold, uses 11104-61-3, Cobalt oxide 11113-66-9, Iron hydroxide 11129-60-5, Manganese oxide 13463-67-7, Titanium dioxide, uses  
(method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)
- IT 14808-60-7, Quartz, analysis  
(tube; method for improved detection of **carbon monoxide** in gas feed stream by IR absorption spectroscopy)
- L73 ANSWER 9 OF 36 HCA COPYRIGHT 2003 ACS on STN  
136:92624 New DRIFTS cell design for the simultaneous acquisition of IR spectra and kinetic data using on-line product analysis. Schubert, M. M.; Haring, T. P.; Brath, G.; Gasteiger, H. A.; Behm, R. J. (Abt. Oberflachenchemie und Katalyse, Universitat Ulm, Ulm, D-89069, Germany). Applied Spectroscopy, 55(11), 1537-1543 (English) 2001. CODEN: APSPA4. ISSN: 0003-7028. Publisher: Society for Applied Spectroscopy.
- AB A new design for a DRIFTS (diffuse reflectance IR Fourier transform spectrometry) cell for in situ studies in heterogeneous **catalysis** is presented, which allows for improved reaction control (i.e., gas flow, temp., minimized background conversion) and for precise kinetic measurements via online gas anal. by a tandem-arranged gas chromatograph. Specifically, the very low background activity of the cell itself for CO and **H2 oxidn.** makes it possible to study the preferential **CO oxidn.** in **H2-rich** gases (PROX) at relevant reaction temps. (150-350.degree.) and reactant concns. (.ltoreq.1 kPa CO and O2). Comparison with results obtained in a quartz tube reactor shows excellent agreement with the reaction rates obtained in the DRIFTS cell. The

improved performance of the new DRIFTS cell design is demonstrated by examg. the influence of **CO2** on the PROX reaction over a Au/Fe2O3 **catalyst**. The addn. of **CO2** to idealized reformat (varying CO and O2 partial pressures, 75 kPa H2, balance N2) significantly reduces both the **CO oxidn.** rate and the selectivity of the PROX reaction on Au/.alpha.-Fe2O3 and strongly affects the frequency of the C-O stretch vibration of adsorbed CO due to **CO2** coadsorption.

IT 124-38-9, **Carbon dioxide**, properties  
 630-08-0, **Carbon monoxide**, properties  
 1309-37-1, Iron oxide (Fe2O3), properties 7440-57-5  
 , Gold, properties 7782-44-7, Oxygen, properties  
 (new DRIFTS cell design for simultaneous acquisition of IR  
 spectra and kinetic data using online product anal.)  
 RN 124-38-9 HCA  
 CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



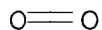
RN 630-08-0 HCA  
 CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 1309-37-1 HCA  
 CN Iron oxide (Fe2O3) (8CI, 9CI) (CA INDEX NAME)  
 \*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*  
 RN 7440-57-5 HCA  
 CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

RN 7782-44-7 HCA  
 CN Oxygen (8CI, 9CI) (CA INDEX NAME)



CC 73-3 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 IT **Catalysis**  
 Diffuse reflectance IR spectroscopy  
 Gas chromatographs  
 IR spectra  
 Partial pressure  
 (new DRIFTS cell design for simultaneous acquisition of IR  
 spectra and kinetic data using online product anal.)  
 IT 124-38-9, **Carbon dioxide**, properties

630-08-0, Carbon monoxide, properties

1309-37-1, Iron oxide (Fe<sub>2</sub>O<sub>3</sub>), properties 7440-57-5

, Gold, properties 7631-86-9, Silicon dioxide, properties

7727-37-9, Nitrogen, properties 7782-44-7, Oxygen,  
properties

(new DRIFTS cell design for simultaneous acquisition of IR  
spectra and kinetic data using online product anal.)

L73 ANSWER 10 OF 36 HCA COPYRIGHT 2003 ACS on STN

136:8077 Integrated two-**catalyst** process for the manufacture  
of vinyl acetate from ethane and oxygen. Zeyss, Sabine;  
Dingerdissen, Uwe; Fritch, John (Aventis Research & Technologies  
G.m.b.H. & Co. K.-G., Germany). PCT Int. Appl. WO 2001090042 A1  
20011129, 20 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AU, AZ, BA,  
BB, BG, BR, BY, CA, CN, CR, CU, CZ, DM, DZ, EE, GD, GE, HR, HU, ID,  
IL, IN, IS, JP, KG, KP, KR, KZ, LC, LK, LR, LT, LV, MA, MD, MG, MK,  
MN, MX, MZ, NO, NZ, PL, RO, RU, SG, SI, SK, SL, TJ, TM, TR, TT, TZ,  
UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT,  
BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR,  
IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English).  
CODEN: PIXXD2. APPLICATION: WO 2000-EP4543 20000519.

AB An integrated process for the manuf. of vinyl acetate comprises: (a)  
contacting in a first reaction zone a gaseous feedstock contg.  
ethane with a mol. **oxygen**-contg. **gas** in the  
presence of a **catalyst** to produce a first product stream  
contg. acetic acid and ethylene; (b) contacting in a second reaction  
zone the first gaseous product stream with a mol. **oxygen**  
-contg. **gas** in the presence of a second **catalyst**  
to produce a product stream contg. vinyl acetate; and (c) sepg. the  
product stream from step (b) and recovering vinyl acetate. A  
process flow diagram is presented.

IT 7439-89-6, Iron, uses 7440-57-5, Gold, uses  
(**catalysts** for the manuf. of ethylene and acetic acid  
from oxygen and ethane in an integrated two-**catalyst**  
process for the manuf. of vinyl acetate)

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA

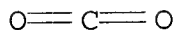
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

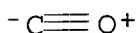
IT 124-38-9P, Carbon dioxide, preparation  
(in an integrated two-**catalyst** process for the manuf.  
of vinyl acetate from ethane and oxygen)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



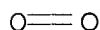
IT 630-08-0P, Carbon monoxide, preparation  
 (in an integrated two-**catalyst** process for the manuf.  
 of vinyl acetate from ethane and oxygen)  
 RN 630-08-0 HCA  
 CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IT 1333-74-0, Hydrogen, reactions  
 (in the manuf. of **catalysts** for the manuf. of ethylene  
 and acetic acid from oxygen and ethane in an integrated two-  
**catalyst** process for the manuf. of vinyl acetate)  
 RN 1333-74-0 HCA  
 CN Hydrogen (8CI, 9CI) (CA INDEX NAME)



IT 7782-44-7, Oxygen, reactions  
 (integrated two-**catalyst** process for the manuf. of  
 vinyl acetate from ethane and oxygen)  
 RN 7782-44-7 HCA  
 CN Oxygen (8CI, 9CI) (CA INDEX NAME)



IC ICM C07C067-055  
 ICS C07C069-15; C07C051-215; C07C053-08  
 CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
 Section cross-reference(s): 23, 35, 48, 67  
 IT Distillation  
 (in an integrated two-**catalyst** process for the manuf.  
 of vinyl acetate from ethane and oxygen)  
 IT Esterification **catalysts**  
 (transition metals for the conversion of ethylene with acetic  
 acid into vinyl acetate)  
 IT Oxidation **catalysts**  
 (transition metals in the manuf. of acetic acid and ethylene from  
 ethane and oxygen)  
 IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses  
 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7439-95-4,  
 Magnesium, uses 7439-96-5, Manganese, uses 7439-98-7,  
 Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1, Niobium,  
 uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses  
 7440-06-4, Platinum, uses 7440-09-7, Potassium, uses 7440-16-6,  
 Rhodium, uses 7440-17-7, Rubidium, uses 7440-18-8, Ruthenium,

uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-24-6, Strontium, uses 7440-25-7, Tantalum, uses 7440-28-0, Thallium, uses 7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-39-3, Barium, uses 7440-42-8, Boron, uses 7440-43-9, Cadmium, uses 7440-45-1, Cerium, uses 7440-46-2, Cesium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-55-3, Gallium, uses **7440-57-5**, Gold, uses 7440-58-6, Hafnium, uses 7440-61-1, Uranium, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-69-9, Bismuth, uses 7440-70-2, Calcium, uses 7440-74-6, Indium, uses 7723-14-0, Phosphorus, uses 13494-80-9, Tellurium, uses

(**catalysts** for the manuf. of ethylene and acetic acid from oxygen and ethane in an integrated two-**catalyst** process for the manuf. of vinyl acetate)

IT 3375-31-3, Palladium diacetate 7803-55-6, Ammonium metavanadate 10124-37-5, Calcium nitrate 11098-84-3, Ammonium molybdate 16455-98-4, Antimony oxalate 51305-35-2, Gold acetate 168547-43-1

(**catalysts** for the manuf. of ethylene and acetic acid from oxygen and ethane in an integrated two-**catalyst** process for the manuf. of vinyl acetate)

IT **124-38-9P, Carbon dioxide**, preparation

(in an integrated two-**catalyst** process for the manuf. of vinyl acetate from ethane and oxygen)

IT **630-08-0P, Carbon monoxide**, preparation

(in an integrated two-**catalyst** process for the manuf. of vinyl acetate from ethane and oxygen)

IT **1333-74-0, Hydrogen**, reactions

(in the manuf. of **catalysts** for the manuf. of ethylene and acetic acid from oxygen and ethane in an integrated two-**catalyst** process for the manuf. of vinyl acetate)

IT 108-05-4P, Acetic acid ethenyl ester, preparation

(integrated two-**catalyst** process for the manuf. of vinyl acetate from ethane and oxygen)

IT 64-19-7P, Acetic acid, preparation 74-85-1P, Ethene, preparation

(integrated two-**catalyst** process for the manuf. of vinyl acetate from ethane and oxygen)

IT 74-84-0, Ethane, reactions

(integrated two-**catalyst** process for the manuf. of vinyl acetate from ethane and oxygen)

IT **7782-44-7, Oxygen**, reactions

(integrated two-**catalyst** process for the manuf. of vinyl acetate from ethane and oxygen)

IT 13463-67-7, Titania, processes

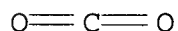
(support; **catalysts** for the manuf. of ethylene and acetic acid from oxygen and ethane in an integrated two-**catalyst** process for the manuf. of vinyl acetate)

catalytic oxidation of ethane and/or ethylene into acetic acid. Zeyss, Sabine; Dingerdisen, Uwe (Aventis Research & Technologies G.m.b.H. & Co. K.-G., Germany). PCT Int. Appl. WO 2001090039 A1 20011129, 22 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (German). CODEN: PIXXD2. APPLICATION: WO 2001-EP4987 20010503. PRIORITY: DE 2000-10024437 20000519.

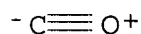
AB The invention relates to a method for the selective prodn. of acetic acid from a gas-phase feed of ethane, ethylene, or mixts. thereof and oxygen at elevated temps. The gas-phase feed is brought into contact with a **catalyst**, contg. the elements Mo, Pd, X and Y in the gram atom ratios a:b:c in combination with oxygen according to formula (I): MoaPdbXcYd (X = one or several of Cr, Mn, Nb, Ta, Ti, V, Te, W; Y = one or several of B, Al, Ga, In, Pt, Zn, Cd, Bi, Ce, Co, Rh, Ir, Cu, Ag, **Au**, **Fe**, Ru, Os, K, Rb, Cs, Mg, Ca, Sr, Ba, Nb, Zr, Hf, Ni, P, Pb, Sb, Si, Sn, Ti, U; a, b, c, d, x = the gram-atom ratio for the corresponding elements, where: a = 1, then b = 0.0001-0.01, c = 0.4-1, d = 0.005-1). The space-time yield for the above oxidn. is >470 kg/(hm<sup>3</sup>). X is preferably Nb and an ammonium salt of niobium is used as the niobium source.

IT 124-38-9, Carbon dioxide, uses  
630-08-0, Carbon monoxide, uses  
(process and **catalysts** for the selective  
**catalytic** oxidn. of ethane and/or ethylene into acetic acid using)

RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IT 7782-44-7, Oxygen, reactions  
(process and **catalysts** for the selective  
**catalytic** oxidn. of ethane and/or ethylene into acetic acid using)

RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

- IC ICM C07C051-215  
ICS C07C051-25; B01J023-652; C07C053-08
- CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
Section cross-reference(s): 23, 48, 67
- ST acetic acid manuf ethane oxidn; ethene oxidn acetic acid manuf;  
ethylene oxidn acetic acid manuf; **catalyst** ethene ethane  
oxidn manuf acetic acid
- IT Oxidation **catalysts**  
(gas-phase; niobium-based compns. for the conversion of ethane  
and/or ethylene with oxygen into acetic acid)
- IT Steam  
(process and **catalysts** for the selective  
**catalytic** oxidn. of ethane and/or ethylene into acetic  
acid using)
- IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses 7439-89-6,  
Iron, uses 7439-92-1, Lead, uses 7439-95-4, Magnesium, uses  
7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses  
7440-02-0, Nickel, uses 7440-03-1, Niobium, uses 7440-04-2,  
Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum,  
uses 7440-09-7, Potassium, uses 7440-16-6, Rhodium, uses  
7440-17-7, Rubidium, uses 7440-18-8, Ruthenium, uses 7440-21-3,  
Silicon, uses 7440-22-4, Silver, uses 7440-24-6, Strontium, uses  
7440-25-7, Tantalum, uses 7440-28-0, Thallium, uses 7440-31-5,  
Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses  
7440-36-0, Antimony, uses 7440-39-3, Barium, uses 7440-42-8,  
Boron, uses 7440-43-9, Cadmium, uses 7440-45-1, Cerium, uses  
7440-46-2, Cesium, uses 7440-47-3, Chromium, uses 7440-48-4,  
Cobalt, uses 7440-50-8, Copper, uses 7440-55-3, Gallium, uses  
7440-57-5, Gold, uses 7440-58-6, Hafnium, uses 7440-61-1,  
Uranium, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses  
7440-67-7, Zirconium, uses 7440-69-9, Bismuth, uses 7440-70-2,  
Calcium, uses 7440-74-6, Indium, uses 7723-14-0, Phosphorus,  
uses 13494-80-9, Tellurium, uses 168547-43-1, Niobium ammonium  
oxalate  
(**catalysts** for the selective **catalytic** oxidn.  
of ethane and/or ethylene into acetic acid)
- IT 64-19-7P, Acetic acid, preparation  
(process and **catalysts** for the selective  
**catalytic** oxidn. of ethane and/or ethylene into acetic  
acid)
- IT 74-84-0, Ethane, reactions 74-85-1, Ethene, reactions  
(process and **catalysts** for the selective  
**catalytic** oxidn. of ethane and/or ethylene into acetic  
acid)
- IT 74-82-8, Methane, uses 124-38-9, Carbon  
dioxide, uses 630-08-0, Carbon  
monoxide, uses 7727-37-9, Nitrogen, uses  
(process and **catalysts** for the selective



**catalytic** oxidn. of ethane and/or ethylene into acetic acid using)

IT 7782-44-7, **Oxygen**, reactions  
(**process** and **catalysts** for the selective  
**catalytic** oxidn. of ethane and/or ethylene into acetic acid using)

L73 ANSWER 12 OF 36 HCA COPYRIGHT 2003 ACS on STN

136:6511) Process and **catalysts** for the production of vinyl acetate from ethane and oxygen. Zeyss, Sabine; Dingerdisen, Uwe; Fritch, John (Aventis Research & Technologies G.m.b.H. & Co. K.-G., Germany). PCT Int. Appl. WO 2001090043 A1 20011129, 25 pp.  
DESIGNATED STATES: W: AE, AG, AL, AM, AU, AZ, BA, BB, BG, BR, BY, CA, CN, CR, CU, CZ, DM, DZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KG, KP, KR, KZ, LC, LK, LR, LT, LV, MA, MD, MG, MK, MN, MX, MZ, NO, NZ, PL, RO, RU, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2.  
APPLICATION: WO 2000-EP4545 20000519.

AB The title process describes contacting, in a first reaction zone, a gaseous feedstock comprising ethane with a mol. **oxygen**-contg. **gas** in the presence of a **catalyst** to produce a first product stream comprising acetic acid; contacting, in a second reaction zone, a gaseous feedstock comprising ethane with a mol. **oxygen**-contg. **gas** in the presence of a **catalyst** to produce a second product stream comprising ethylene; contacting in a third reaction zone the first gaseous product stream and the second gaseous product stream with a mol. **oxygen**-contg. **gas** in the presence of a **catalyst** to produce a fourth product stream comprising vinyl acetate; sepg. the product stream from step (3) and recovering vinyl acetate. A process flow diagram is presented.

IT 7439-89-6, Iron, uses 7440-57-5, Gold, uses  
(**catalysts** for the manuf. of ethylene and acetic acid from oxygen and ethane in an integrated two-**catalyst** process for the manuf. of vinyl acetate)

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

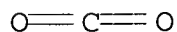
RN 7440-57-5 HCA

CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

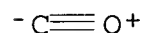
IT 124-38-9P, **Carbon dioxide**, preparation  
(in an integrated two-**catalyst** process for the manuf. of vinyl acetate from ethane and oxygen)

RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



IT 630-08-0P, **Carbon monoxide**, preparation  
(in an integrated two-**catalyst** process for the manuf.  
of vinyl acetate from ethane and oxygen)

RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



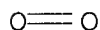
IT 1333-74-0, Hydrogen, reactions  
(in the manuf. of **catalysts** for the manuf. of ethylene  
and acetic acid from oxygen and ethane in an integrated two-  
**catalyst** process for the manuf. of vinyl acetate)

RN 1333-74-0 HCA  
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)



IT 7782-44-7, Oxygen, reactions  
(integrated two-**catalyst** process for the manuf. of  
vinyl acetate from ethane and oxygen)

RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)



IC ICM C07C067-055  
ICS C07C069-15; C07C051-215; C07C053-08; C07C005-48; C07C011-04  
CC 35-2 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 23, 48, 67  
ST vinyl acetate manuf continuous process; monomer vinyl acetate manuf  
continuous process; **catalyst** vinyl acetate manuf ethane  
conversion; ethane oxygen reaction manuf vinyl acetate  
IT Distillation  
(in an integrated two-**catalyst** process for the manuf.  
of vinyl acetate from ethane and oxygen)  
IT Dehydrogenation **catalysts**  
(oxidative; transition metals in the manuf. of acetic acid and  
ethylene from ethane and oxygen)  
IT Esterification **catalysts**  
(transition metals for the conversion of ethylene with acetic  
acid into vinyl acetate)  
IT Oxidation **catalysts**  
(transition metals in the manuf. of acetic acid and ethylene from

- ethane and oxygen)
- IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses **7439-89-6**, Iron, uses 7439-92-1, Lead, uses 7439-93-2, Lithium, uses 7439-95-4, Magnesium, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1, Niobium, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-09-7, Potassium, uses 7440-16-6, Rhodium, uses 7440-17-7, Rubidium, uses 7440-18-8, Ruthenium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-23-5, Sodium, uses 7440-24-6, Strontium, uses 7440-25-7, Tantalum, uses 7440-28-0, Thallium, uses 7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-39-3, Barium, uses 7440-42-8, Boron, uses 7440-43-9, Cadmium, uses 7440-45-1, Cerium, uses 7440-46-2, Cesium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-55-3, Gallium, uses **7440-57-5**, Gold, uses 7440-58-6, Hafnium, uses 7440-61-1, Uranium, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-69-9, Bismuth, uses 7440-70-2, Calcium, uses 7440-74-6, Indium, uses 7723-14-0, Phosphorus, uses 13494-80-9, Tellurium, uses (catalysts for the manuf. of ethylene and acetic acid from oxygen and ethane in an integrated two-catalyst process for the manuf. of vinyl acetate)
- IT **124-38-9P**, Carbon dioxide, preparation (in an integrated two-catalyst process for the manuf. of vinyl acetate from ethane and oxygen)
- IT **630-08-0P**, Carbon monoxide, preparation (in an integrated two-catalyst process for the manuf. of vinyl acetate from ethane and oxygen)
- IT **1333-74-0**, Hydrogen, reactions 3375-31-3, Palladium diacetate 7803-55-6, Ammonium metavanadate 10124-37-5, Calcium nitrate 11098-84-3, Ammonium molybdate 16455-98-4, Antimony oxalate 51305-35-2, Gold acetate 168547-43-1 (in the manuf. of catalysts for the manuf. of ethylene and acetic acid from oxygen and ethane in an integrated two-catalyst process for the manuf. of vinyl acetate)
- IT 108-05-4P, Vinyl acetate, preparation (integrated two-catalyst process for the manuf. of vinyl acetate from ethane and oxygen)
- IT 64-19-7P, Acetic acid, preparation 74-85-1P, Ethene, preparation (integrated two-catalyst process for the manuf. of vinyl acetate from ethane and oxygen)
- IT 74-84-0, Ethane, reactions (integrated two-catalyst process for the manuf. of vinyl acetate from ethane and oxygen)
- IT **7782-44-7**, Oxygen, reactions (integrated two-catalyst process for the manuf. of vinyl acetate from ethane and oxygen)
- IT 13463-67-7, Titania, uses (support; catalysts for the manuf. of ethylene and acetic acid from oxygen and ethane in an integrated two-

~~catalyst~~ process for the manuf. of vinyl acetate)

L73 ANSWER 13 OF 36 HCA COPYRIGHT 2003 ACS on STN

134:198664 A Dual **Catalyst** Bed System for the Elimination of Hydrogen from CO<sub>2</sub> Feed Gas in Urea Synthesis. Hao,

Zheng-Ping; An, Li-Dun; Wang, Hong-Li; Lu, G. Q. (Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, Lanzhou, 730000, Peop. Rep. China). Industrial & Engineering Chemistry Research, 40(7), 1591-1593 (English) 2001. CODEN: IECRED. ISSN: 0888-5885. Publisher: American Chemical Society.

AB A dual **catalyst** bed system (Au/Fe<sub>2</sub>O<sub>3</sub> + Pt-Pd/Al<sub>2</sub>O<sub>3</sub>) for eliminating hydrogen from the CO<sub>2</sub> feed gas in urea synthesis is found to be far superior to com. available and patented **catalysts** in **catalytic** activity. At relatively low temps., hydrogen is eliminated and coexistent CO is also **oxidized** completely to useful CO<sub>2</sub>. This can avoid effectively the accidental explosion of hydrogen-oxygen-ammonia mixed **gases**, thus ensuring the safety of urea synthesis.

IT 1309-37-1, Iron oxide(Fe<sub>2</sub>O<sub>3</sub>), uses 7440-57-5, Gold, uses

(dual **catalyst** bed system for elimination of hydrogen from CO<sub>2</sub> feed gas in urea synthesis)

RN 1309-37-1 HCA

CN Iron oxide (Fe<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7440-57-5 HCA

CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 124-38-9, Carbon dioxide, reactions

(dual **catalyst** bed system for elimination of hydrogen from CO<sub>2</sub> feed gas in urea synthesis)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

IT 1333-74-0, Hydrogen, processes

(dual **catalyst** bed system for elimination of hydrogen from CO<sub>2</sub> feed gas in urea synthesis)

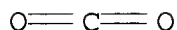
RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

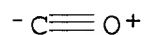
H-H

CC 67-2 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)

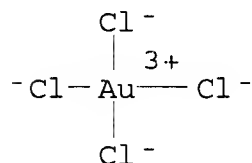
- Section cross-reference(s): 45, 48
- ST dual **catalyst** bed elimination hydrogen **carbon dioxide** feed urea; explosion prevention dual **catalyst** bed elimination hydrogen **carbon dioxide**; safety dual **catalyst** bed elimination hydrogen **carbon dioxide** feed
- IT **Catalysts**  
Safety  
(dual **catalyst** bed system for elimination of hydrogen from CO<sub>2</sub> feed gas in urea synthesis)
- IT Explosion  
(prevention of; dual **catalyst** bed system for elimination of hydrogen from CO<sub>2</sub> feed gas in urea synthesis)
- IT 1309-37-1, Iron oxide(Fe<sub>2</sub>O<sub>3</sub>), uses 1344-28-1, Alumina, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-57-5, Gold, uses  
(dual **catalyst** bed system for elimination of hydrogen from CO<sub>2</sub> feed gas in urea synthesis)
- IT 124-38-9, **Carbon dioxide**, reactions  
(dual **catalyst** bed system for elimination of hydrogen from CO<sub>2</sub> feed gas in urea synthesis)
- IT 1333-74-0, **Hydrogen**, processes  
(dual **catalyst** bed system for elimination of hydrogen from CO<sub>2</sub> feed gas in urea synthesis)
- IT 57-13-6P, Urea, preparation  
(dual **catalyst** bed system for elimination of hydrogen from CO<sub>2</sub> feed gas in urea synthesis)
- L73 ANSWER 14 OF 36 HCA COPYRIGHT 2003 ACS on STN
- 134:33438 Preparation of supported gold catalyst by bacterial reduction method. Fu, Jinkun; Wen, Shengzhou; Yao, Gingxin; Liu, Yueying; Fu, Jinyin; Yu, Xinsheng; Hu, Rongzong; Zeng, Jinlong; Lin, Zhongyu; Gu, Pingying (Xiamen Univ., Peop. Rep. China). Faming Zhuanli Shenqing Gongkai Shuomingshu CN 1251323 A 20000426, 5 pp. (Chinese). CODEN: CNXXEV. APPLICATION: CN 1999-120177 19990917.
- AB The process comprises impregnating metal oxide isometrically with chloroauric acid, drying under vacuum and 60-90.degree. for 2-4 h, cooling to normal temp., immersing in the suspension soln. of gram-pos. bacillus at 15-50.degree. and pH 2-5 for 0.5-2 h, drying under vacuum and 60-90.degree. for 2-4 h to obtain the catalyst. The ratios of Au<sup>3+</sup> to the metal oxide and gram-pos. bacillus are 1-3:100 and 10:1-2 resp. The metal oxide is selected from TiO<sub>2</sub>, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, .alpha.-Fe<sub>2</sub>O<sub>3</sub>, or Co<sub>3</sub>O<sub>4</sub>. The redn. percentage of Au<sup>3+</sup> is 85-100%, and the particle size of Au<sup>0</sup> is 4.5-12 nm. Using the catalyst to catalyze the conversion of CO into CO<sub>2</sub>, the CO conversion is high to 100%, and the stabilization period is up to 75 h.
- IT 124-38-9P, **Carbon dioxide**, preparation  
(prepn. of supported gold catalyst by bacterial redn. method)
- RN 124-38-9 HCA
- CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



IT 630-08-0, Carbon monoxide, reactions  
 16903-35-8, Chloroauric acid  
 (prepn. of supported gold catalyst by bacterial redn. method)  
 RN 630-08-0 HCA  
 CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 16903-35-8 HCA  
 CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)



IT 1309-37-1, Ferric oxide, uses  
 (support; prepn. of supported gold catalyst by bacterial redn. method)  
 RN 1309-37-1 HCA  
 CN Iron oxide (Fe<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)  
 \*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*  
 IC ICM B01J023-52  
 ICS B01J037-16  
 CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
 Section cross-reference(s): 10  
 ST oxidn carbon monoxide gold catalyst bacterial redn  
 IT 124-38-9P, Carbon dioxide, preparation  
 (prepn. of supported gold catalyst by bacterial redn. method)  
 IT 630-08-0, Carbon monoxide, reactions  
 16903-35-8, Chloroauric acid  
 (prepn. of supported gold catalyst by bacterial redn. method)  
 IT 1308-06-1, Cobalt oxide (Co<sub>3</sub>O<sub>4</sub>) 1309-37-1, Ferric oxide, uses  
 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 13463-67-7, Titania, uses  
 (support; prepn. of supported gold catalyst by bacterial redn. method)

L73 ANSWER 15 OF 36 HCA COPYRIGHT 2003 ACS on STN  
 132:239292 Catalysts and process for reforming of  
hydrocarbons. Millar, Graeme John; Gamman, Jonathan James  
 (University of Queensland, Australia). PCT Int. Appl. WO 2000016899  
 A1 20000330, 46 pp. DESIGNATED STATES: W: AE, AL, AM, AT, AU, AZ,  
 BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI,  
 GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,  
 LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT,  
 RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ,  
 VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF,  
 BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT,  
 LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN:  
 PIXXD2. APPLICATION: WO 1999-AU802 19990921. PRIORITY: AU  
 1998-6073 19980921.

AB The present invention is directed to **catalysts** for the  
prodn. of a mixt. of hydrogen and carbon monoxide  
by carbon dioxide reforming as well as to the  
 precursors of such **catalysts**. The **catalyst**  
 precursors include a mixt. of nickel oxide and an oxide of cubic  
 structural type which is an oxygen ion conductor at elevated temps.  
 Processes for the prepn. of such **catalyst** precursors and  
**catalysts** are also disclosed, as are processes for producing  
 a mixt. of hydrogen and **carbon monoxide** by  
**carbon dioxide** reforming of a hydrocarbon  
 feedstock.

IT 7440-57-5, Gold, uses 66812-71-3, Cobalt iron  
 strontium oxide 159423-43-5D, Calcium cobalt iron  
 lanthanum oxide (Ca<sub>0.4</sub>Co<sub>0.2</sub>Fe<sub>0.8</sub>La<sub>0.6</sub>O<sub>3</sub>), oxygen-deficient  
 175865-42-6D, Cobalt iron lanthanum strontium oxide  
 ((Co,Fe)(La,Sr)O<sub>3</sub>), oxygen-deficient  
 (**catalysts** and process for reforming of hydrocarbons)

RN 7440-57-5 HCA  
 CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

RN 66812-71-3 HCA  
 CN Cobalt iron strontium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O	x	17778-80-2
Co	x	7440-48-4
Sr	x	7440-24-6
Fe	x	7439-89-6

RN 159423-43-5 HCA  
 CN Calcium cobalt iron lanthanum oxide (Ca<sub>0.4</sub>Co<sub>0.2</sub>Fe<sub>0.8</sub>La<sub>0.6</sub>O<sub>3</sub>) (9CI)  
 (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	3	17778-80-2
Ca	0.4	7440-70-2
Co	0.2	7440-48-4
La	0.6	7439-91-0
Fe	0.8	7439-89-6

RN 175865-42-6 HCA

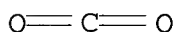
CN Cobalt iron lanthanum strontium oxide ((Co,Fe)(La,Sr)O3) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	3	17778-80-2
Co	0 - 1	7440-48-4
Sr	0 - 1	7440-24-6
La	0 - 1	7439-91-0
Fe	0 - 1	7439-89-6

IT 124-38-9, Carbon dioxide, reactions  
(catalysts and process for reforming of hydrocarbons)

RN 124-38-9 HCA

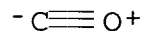
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



IT 630-08-0P, Carbon monoxide, preparation  
1333-74-0P, Hydrogen, preparation  
(synthesis gas contg.; catalysts and process  
for reforming of hydrocarbons)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)



IC ICM B01J023-83

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 67

ST catalyst reforming hydrocarbon synthesis gas manuf

IT Reforming catalysts  
(catalysts and process for reforming of hydrocarbons)



IT Synthesis gas manufacturing  
 (reforming synthesis gas manufg.; **catalysts** and process  
 for reforming of hydrocarbons)

IT 1304-28-5, Barium oxide, uses 1305-78-8, Calcium oxide, uses  
 1312-81-8, Lanthanum oxide 1313-27-5, Molybdenum trioxide, uses  
 1313-96-8, Niobium oxide 1313-97-9, Neodymium oxide 1313-99-1,  
 Nickel oxide, uses 1314-11-0, Strontium oxide, uses 1314-23-4,  
 Zirconium oxide, uses 1314-35-8, Tungsten trioxide, uses  
 1314-36-9, Yttrium oxide, uses 1314-37-0, Ytterbium oxide  
 1314-62-1, Vanadium oxide, uses 1317-36-8, Lead oxide, uses  
 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses 7440-04-2,  
 Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum,  
 uses 7440-10-0, Praseodymium, uses 7440-15-5, Rhenium, uses  
 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-19-9,  
 Samarium, uses 7440-22-4, Silver, uses 7440-27-9, Terbium, uses  
 7440-31-5, Tin, uses 7440-36-0, Antimony, uses 7440-38-2,  
 Arsenic, uses 7440-42-8, Boron, uses 7440-50-8, Copper, uses  
 7440-54-2, Gadolinium, uses 7440-55-3, Gallium, uses 7440-56-4,  
 Germanium, uses **7440-57-5**, Gold, uses 7440-64-4,  
 Ytterbium, uses 7440-65-5, Yttrium, uses 7440-66-6, Zinc, uses  
 7440-74-6, Indium, uses 7723-14-0, Phosphorus, uses 7759-01-5,  
 Lead tungsten oxide (pbwo4) 10190-55-3D, Lead molybdenum oxide  
 (pbmoo4), sodium-contg. 11071-75-3, Barium yttrium oxide (ba3y4o9)  
 11073-79-3, Gadolinium zirconium oxide (gd2zr2o7) 11073-79-3D,  
 Gadolinium zirconium oxide (gd2zr2o7), phosphorus or fluorine-contg.  
 11078-74-3, Bismuth yttrium oxide (bi3yo6) 11096-06-3, Neodymium  
 zirconium oxide (nd2zr2o7) 12003-77-9, Aluminum neodymium oxide  
 (alndo3) 12005-21-9, Aluminum yttrium oxide (al5y3o12)  
 12005-57-1, Aluminum calcium oxide (al14ca12o33) 12016-86-3,  
 Cobalt lanthanum oxide (colao3) 12024-89-4, Gadolinium titanium  
 oxide (gd2ti2o7) 12036-39-4, Strontium zirconium oxide (srzro3)  
 12036-39-4D, Strontium zirconium oxide (srzro3),  
 scandium-yttrium-ytterbium-contg. 12036-39-4D, Strontium zirconium  
 oxide (srzro3), ytterbium-contg. 12036-41-8, Terbium oxide  
 12036-99-6, Strontium titanium oxide (sr3ti2o7) 12037-00-2,  
 Strontium zirconium oxide (sr3zr2o7) 12037-02-4, Titanium yttrium  
 oxide (ti2y2o7) 12037-29-5, Praseodymium oxide (pr6o11)  
 12049-50-2, Calcium titanium oxide (catio3) 12049-50-2D, Calcium  
 titanium oxide (catio3), magnesium-contg. 12060-08-1, Scandium  
 oxide 12060-58-1, Samarium oxide 12064-62-9, Gadolinium oxide  
 12065-87-1D, Samarium titanium oxide (sm2ti2o7),  
 calcium-magnesium-strontium-contg. 12160-53-1, Gallium lanthanum  
 oxide (galao3) 12160-53-1D, Gallium lanthanum oxide (galao3),  
 calcium-contg. 12165-20-7, Samarium zirconium oxide (sm2zr2o7)  
 12267-77-5, Barium cerium oxide (baceo3) 12267-77-5D, Barium  
 cerium oxide (baceo3), gadolinium-neodymium-ytterbium-contg.  
 12267-97-9D, Cerium strontium oxide (cesro3), ytterbium-contg.  
 12267-97-9D, Cerium strontium oxide (cesro3), yttrium-contg.  
 12293-73-1, Niobium strontium oxide (nb2sr6o11) 12293-95-7,  
 Strontium tantalum oxide (sr6ta2o11) 12423-60-8D, Terbium  
 zirconium oxide (tb2zr2o7), oxygen-sufficient 12524-97-9, Calcium  
 gallium lanthanum oxide (CaGa3LaO7) 12612-31-6, Cobalt strontium

oxide 13463-67-7, Titania, uses 14059-33-7, Bismuth vanadium oxide (bivo4) 14059-33-7D, Bismuth vanadium oxide (bivo4), calcium and/or cerium-contg. 55575-02-5, Cerium gadolinium oxide 58071-65-1, Barium calcium niobium oxide 59114-54-4, Calcium magnesium titanium oxide 61028-37-3, Barium niobium oxide (ba6nb2o11) 61178-89-0, Barium tantalum oxide (ba6ta2o11) 61332-51-2, Bismuth calcium vanadium oxide 61673-95-8, Strontium ytterbium zirconium oxide 62339-36-0, Barium indium oxide (ba2in2o5) 64417-98-7, Yttrium zirconium oxide **66812-71-3**, Cobalt iron strontium oxide 68248-87-3, Bismuth strontium oxide (bi2sro4) 74749-98-7, Cerium neodymium oxide (ce2nd2o7) 101062-42-4, Barium titanium oxide (ba3ti2o7) 108916-22-9D, Lanthanum manganese strontium oxide (la0.8mnsr0.2o3), oxygen-sufficient 109168-06-1, Scandium zirconium oxide (ScZr0.5O2.5) 110740-64-2, Gadolinium titanium hydroxide oxide (gd2ti3(oh)2o8) 110740-74-4, Neodymium titanium hydroxide oxide (nd2ti3(oh)2o8) 111556-60-6, Samarium titanium hydroxide oxide (sm2ti3(oh)2o8) 111556-61-7, Lanthanum titanium hydroxide oxide (la2ti3(oh)2o8) 116190-37-5, Bismuth lead vanadium oxide 119539-16-1, Magnesium strontium titanium oxide (mg0.1sr3ti1.9o6.9) 123033-53-4, Gadolinium titanium zirconium oxide (Gd2(Ti,Zr)2O7) 123033-53-4D, Gadolinium titanium zirconium oxide (Gd2(Ti,Zr)2O7), calcium-contg. 125297-88-3, Chromium lanthanum magnesium oxide 127466-23-3, Barium indium oxide (ba8in6o17) 129108-40-3, Calcium niobium hydroxide oxide (ca2nb3(oh)o9) 130989-63-8, Barium indium terbium oxide (bain0.1tb0.9o3) 133067-46-6, Barium indium zirconium oxide (ba3in2zro8) 133067-47-7, Barium hafnium indium oxide (ba3hfin2o8) 133067-48-8, Barium cerium indium oxide (ba3cein2o8) 134775-48-7, Calcium cerium gadolinium oxide (cace0.9gd0.1o3) 134775-49-8, Calcium cerium erbium oxide (cace0.9er0.1o3) 140115-94-2, Barium gadolinium thorium oxide (bagd0.1th0.9o3) 142512-68-3, Cerium niobium yttrium oxide (ce0.1nb0.15y0.75o1.7) 143846-51-9, Gadolinium strontium oxide (gd2sr2o5) 143846-52-0, Dysprosium strontium oxide (dy2sr2o5) 149498-85-1, Aluminum calcium neodymium oxide (alca0.1nd0.9o3) 150787-44-3, Barium scandium zirconium oxide (ba3sc2zro8) 150787-49-8, Barium yttrium zirconium oxide (ba3y2zro8) 153594-69-5, Barium bismuth scandium titanium oxide (babi4scti3o14.5) 153594-70-8, Barium bismuth indium titanium oxide (babi4inti3o14.5) 153594-74-2, Barium indium titanium oxide (ba3in2tio8) 157911-41-6, Bismuth Copper vanadium oxide 157972-21-9, Barium indium zirconium oxide 158395-02-9, Antimony oxide (sb2o) 159133-53-6, Yttrium zirconium oxide ((Y,Zr)O1.5-2) **159423-43-5D**, Calcium cobalt iron lanthanum oxide (Ca0.4Co0.2Fe0.8La0.6O3), oxygen-deficient **175865-42-6D**, Cobalt iron lanthanum strontium oxide ((Co,Fe)(La,Sr)O3), oxygen-deficient 177956-28-4, Barium bismuth oxide (babi2o4) 189125-47-1, Barium cerium gadolinium oxide (ba(ce,gd)o2-3) 216440-96-9, Gadolinium titanium zirconium oxide 228265-07-4, Cerium strontium yttrium oxide 254448-99-2, Scandium oxide (sc2o5) 261639-00-3, Barium cerium gadolinium oxide (Ba3CeGd2O8) 261732-84-7, Calcium lanthanum oxide (CaLa2O4)

261732-88-1D, Calcium cobalt samarium oxide ( $\text{Ca}_{0.4}\text{CoSm}_{0.603}$ ), oxygen-deficient 261732-90-5D, Barium indium zirconium oxide ( $\text{BaIn}_{0.7}\text{Zr}_{0.303}$ ), oxygen-deficient 261732-97-2, Barium strontium tantalum oxide ( $\text{Ba}_6\text{SrTa}_2\text{O}_{11}$ ) 261732-98-3, Hafnium indium strontium oxide ( $\text{HfIn}_2\text{SrO}_8$ ) 261732-99-4, Bismuth copper nickel vanadium oxide 261733-00-0 261733-01-1, Calcium gallium lanthanum oxide 261733-02-2, Cerium neodymium zirconium oxide ( $\text{CeNd}_2\text{ZrO}_7$ ) 261733-03-3, Titanium yttrium zirconium oxide ( $\text{Ti}_2\text{-4Y}_2\text{ZrO-207}$ ) 261733-04-4, Gadolinium ruthenium zirconium oxide 261733-05-5 261733-06-6, Lanthanum lead tungsten oxide ( $\text{La}_2\text{Pb}_8\text{WO}_{4.1}$ ) 261733-08-8, Bismuth calcium cerium vanadium oxide 261733-10-2, Lead molybdenum sodium oxide 261733-11-3, Bismuth praseodymium oxide ( $\text{BiPr}_3\text{O}_7$ ) 261733-12-4 261733-13-5, Niobium scandium strontium oxide 261733-15-7, Bismuth copper vanadium oxide ( $\text{Bi}_2(\text{Cu,V})\text{O}_{5.35}$ ) 261733-17-9 261777-89-3, Cerium gadolinium oxide ( $(\text{Ce,Gd})\text{O}_{1.5-2}$ ) 261777-91-7, Chromium lanthanum magnesium oxide ( $(\text{Cr,Mg})\text{LaO}_{2.5-3}$ ) 261777-94-0, Barium gadolinium gallium indium oxide ( $\text{Ba}_2\text{Gd}(\text{Ga,In})\text{O}_5$ ) 261777-95-1

(**catalysts** and process for reforming of hydrocarbons)

IT 74-82-8, Methane, reactions **124-38-9, Carbon dioxide**, reactions

(**catalysts** and process for reforming of hydrocarbons)

IT 630-08-0P, **Carbon monoxide**, preparation

1333-74-0P, **Hydrogen**, preparation

(synthesis **gas** contg.; **catalysts** and process for reforming of hydrocarbons)

IT 1314-61-0, Tantalum oxide

(.alpha.-; **catalysts** and process for reforming of hydrocarbons)

IT 1304-76-3, Bismuth oxide, uses

(.delta.-; **catalysts** and process for reforming of hydrocarbons)

U73 ANSWER 16 OF 36 HCA COPYRIGHT 2003 ACS on STN

132:224663 Process and **catalysts** for the methanation of oxides

of carbon. Henville, Kim Elizabeth; Millar, Graeme John; Alarco, Jose Antonio (The University of Queensland, Australia). PCT Int. Appl. WO 2000016901 A1 20000330, 59 pp. DESIGNATED STATES: W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1999-AU804 19990921. PRIORITY: AU 1998-6071 19980921.

AB The present invention is directed to **catalysts** for the conversion of oxides of carbon to methane and/or other hydrocarbons and to precursors of such **catalysts**. The **catalyst** precursors include one or more refractory oxides selected from the group consisting of rare earth oxides and rare earth contg.

perovskites, the precursor including nickel or nickel cations sufficient for a **catalyst** obtainable by reducing the precursor to be capable of at least partially reducing an oxide of carbon to a hydrocarbon product. Processes for the prepn. of such **catalysts** and **catalyst** precursors are also disclosed, as are processes for the conversion of oxides of carbon to methane and/or other hydrocarbons.

IT 7439-89-6, Iron, uses 7440-57-5, Gold, uses  
(**catalysts** contg.; process and **catalysts** for  
the methanation of oxides of carbon)

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA

CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 124-38-9, Carbon dioxide, reactions  
630-08-0, Carbon monoxide, reactions  
1333-74-0, Hydrogen, reactions  
(feeds contg.; process and **catalysts** for the  
methanation of oxides of carbon)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

$\text{O}=\text{C}=\text{O}$

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

$-\text{C}\equiv\text{O}^+$

RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IC ICM B01J023-83

CC 51-5 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 67

ST **catalyst** methanation carbon oxide; rare earth oxide  
**catalyst** methanation; perovskite rare earth contg  
methanation **catalyst**

IT Perovskite-type crystals

(**catalysts** contg.; process and **catalysts** for the methanation of oxides of carbon)

IT Alkaline earth metals

Group IIIA elements

Group IVB elements

Group VB elements

Group VIB elements

Group VIIB elements

Group VIII elements

Rare earth oxides

(**catalysts** contg.; process and **catalysts** for the methanation of oxides of carbon)

IT Methanation **catalysts**

(process and **catalysts** for the methanation of oxides of carbon)

IT Hydrocarbons, preparation

(process and **catalysts** for the methanation of oxides of carbon)

IT 1308-87-8, Dysprosium oxide 1308-96-9, Europium oxide 1312-81-8, Lanthanum oxide 1313-27-5, Molybdenum trioxide, uses 1313-96-8, Niobium oxide 1313-97-9, Neodymium oxide 1313-99-1, Nickel oxide, uses 1314-23-4, Zirconia, uses 1314-35-8, Tungsten trioxide, uses 1314-36-9, Yttrium oxide, uses 1314-37-0, Ytterbium oxide 1314-61-0, Tantalum oxide 1314-62-1, Vanadium oxide (V2O5), uses 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses **7439-89-6**, Iron, uses 7439-95-4, Magnesium, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1, Niobium, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses 7440-24-6, Strontium, uses 7440-25-7, Tantalum, uses 7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-36-0, Antimony, uses 7440-38-2, Arsenic, uses 7440-39-3, Barium, uses 7440-42-8, Boron, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-55-3, Gallium, uses 7440-56-4, Germanium, uses **7440-57-5**, Gold, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-70-2, Calcium, uses 7440-74-6, Indium, uses 7723-14-0, Phosphorus, uses 11129-18-3, Cerium oxide 12003-77-9, Aluminum neodymium oxide (alndo3) 12032-20-1, Lutetium oxide 12036-32-7, Praseodymium oxide 12036-41-8, Terbium oxide 12036-44-1, Thulium oxide 12055-62-8, Holmium oxide 12060-58-1, Samarium oxide 12061-16-4, Erbium oxide 12160-53-1, Gallium lanthanum oxide (galao3) 12267-77-5, Barium cerium oxide (baceo3) 13463-67-7, Titania, uses 130989-63-8, Barium indium terbium oxide (bain0.1tb0.9o3) 134775-48-7, Calcium cerium gadolinium oxide (cace0.9gd0.1o3) 134775-49-8, Calcium cerium erbium oxide (cace0.9er0.1o3) 149498-85-1, Aluminum calcium neodymium oxide (alca0.1nd0.9o3) 155343-26-3D, Gallium lanthanum magnesium strontium oxide (ga0.8la0.9mg0.2sr0.1o3), oxygen-deficient 177027-88-2D, Gallium lanthanum magnesium strontium oxide (ga0.85la0.8mg0.15sr0.2o3), oxygen-deficient 189125-47-1, Barium

cerium gadolinium oxide (Ba(Ce,Gd)O<sub>2-3</sub>) 254448-99-2,  
Scandium oxide (Sc<sub>2</sub>O<sub>5</sub>) 261639-00-3, Barium cerium gadolinium oxide  
(Ba<sub>3</sub>CeGd<sub>2</sub>O<sub>8</sub>)

(**catalysts** contg.; process and **catalysts** for  
the methanation of oxides of carbon)

IT 124-38-9, **Carbon dioxide**, reactions

630-08-0, **Carbon monoxide**, reactions

1333-74-0, Hydrogen, reactions

(feeds contg.; process and **catalysts** for the  
methanation of oxides of carbon)

IT 12064-62-9, Gadolinium oxide

(process and **catalysts** for the methanation of oxides of  
carbon)

IT 74-82-8P, Methane, preparation

(process and **catalysts** for the methanation of oxides of  
carbon)

L73 ANSWER 17 OF 36 HCA COPYRIGHT 2003 ACS on STN

131:338610 Method and **catalysts** for the manufacture of of  
alkyl carboxylic acids by the carboxylation of lower alkanes.

Spivey, James J.; Gogate, Makarand R. (USA). PCT Int. Appl. WO

9959952 A1 19991125, 23 pp. DESIGNATED STATES: W: AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB,  
GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,  
LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD,  
SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM,  
AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI,  
CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE,  
NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO  
1999-US10709 19990514. PRIORITY: US 1998-85632 19980515.

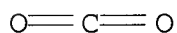
AB Alkyl carboxylic acids, such as acetic acid, are directly prepd. by  
carboxylation of alkanes, such as methane, with **carbon  
dioxide** in the presence of a heterogeneous **catalyst**  
(e.g., 5% Pd/C).

IT 124-38-9P, **Carbon dioxide**, preparation

(method and **catalysts** for the manuf. of of alkyl  
carboxylic acids by the carboxylation of lower alkanes)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



IT 7439-89-6, Iron, uses 7440-57-5, Gold, uses

(method and **catalysts** for the manuf. of of alkyl  
carboxylic acids by the carboxylation of lower alkanes)

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA  
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 630-08-0, Carbon monoxide, uses  
7782-44-7, Oxygen, uses  
(method and **catalysts** for the manuf. of of alkyl  
carboxylic acids by the carboxylation of lower alkanes)

RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

$\text{-C}\equiv\text{O}^+$

RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)

$\text{O}=\text{O}$

IC ICM C07C051-14  
CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
Section cross-reference(s): 23, 48, 60, 67  
ST acetic acid manuf methane carboxylation; carboxylation  
**catalyst** manuf carboxylic acid; **carbon**  
**dioxide** carboxylation methane manuf acetic acid  
IT Alkanes, reactions  
(C1-12; method and **catalysts** for the manuf. of of alkyl  
carboxylic acids by the carboxylation of lower alkanes)  
IT Natural gas, reactions  
(**carbon dioxide** from combustion of for the  
manuf. of of alkyl carboxylic acids by the carboxylation of lower  
alkanes)  
IT Transition metals, uses  
(carboxylation **catalysts** for the manuf. of of alkyl  
carboxylic acids by the carboxylation of lower alkanes)  
IT Minerals, uses  
(hydrotalcite-group, supports; carboxylation **catalysts**  
for the manuf. of of alkyl carboxylic acids by the carboxylation  
of lower alkanes)  
IT Carboxylation  
(of lower alkanes with **CO2** in the manuf. of carboxylic  
acids)  
IT Carboxylation **catalysts**  
(supported transition metals for the conversion of lower alkanes  
with **CO2** into carboxylic acids)  
IT Group IIIA element oxides  
Group IVA element oxides  
(supports; carboxylation **catalysts** for the manuf. of of  
alkyl carboxylic acids by the carboxylation of lower alkanes)

- IT Carboxylic acids, preparation  
(unsatd., C3-9 alkenoic acids; method and **catalysts** for the manuf. of of alkyl carboxylic acids by the carboxylation of lower alkanes)
- IT 7440-44-0, Activated carbon, uses  
(activated, support; method and **catalysts** for the manuf. of of alkyl carboxylic acids by the carboxylation of lower alkanes)
- IT 124-38-9P, Carbon dioxide, preparation  
(method and **catalysts** for the manuf. of of alkyl carboxylic acids by the carboxylation of lower alkanes)
- IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses  
(method and **catalysts** for the manuf. of of alkyl carboxylic acids by the carboxylation of lower alkanes)
- IT 64-19-7P, Acetic acid, preparation  
(method and **catalysts** for the manuf. of of alkyl carboxylic acids by the carboxylation of lower alkanes)
- IT 630-08-0, Carbon monoxide, uses 7782-44-7, Oxygen, uses  
(method and **catalysts** for the manuf. of of alkyl carboxylic acids by the carboxylation of lower alkanes)
- IT 74-82-8, Methane, reactions  
(method and **catalysts** for the manuf. of of alkyl carboxylic acids by the carboxylation of lower alkanes)
- IT 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 159995-97-8, Aluminum silicon oxide  
(support; method and **catalysts** for the manuf. of of alkyl carboxylic acids by the carboxylation of lower alkanes)

L73 ANSWER 18 OF 36 HCA COPYRIGHT 2003 ACS on STN

130:317116 Preparation of nanometric metal, metal oxide, and semiconductor cluster catalysts. Spatz, Joachim; Moller, Martin; Herzog, Thomas; Mossmer, Stefan; Ziemann, Paul (Universitat Ulm, Germany). PCT Int. Appl. WO 9921652 A2 19990506, 59 pp. DESIGNATED STATES: W: AU, CA, JP, KR, LK, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (German). CODEN: PIXXD2. APPLICATION: WO 1998-EP6874 19981029. PRIORITY: DE 1997-19747816 19971029; DE 1997-19747815 19971029; DE 1998-19843411 19980919.

AB The invention relates to nanometric structuring and decorating of substrates. The invention esp. relates to surface decorated substrates on which ordered nanometric surface structures comprised of metal and/or metal oxide clusters and/or semiconductor clusters are deposited. The invention also relates to a method for producing and applying said surface decorated structures in order to epoxidize C3-C8-alkenes or to oxidize CO to CO2, and relates to surface structured substrates, esp. Pt, Au, GaAs,



InyGaAs, AlxGaAs, Si, SiO<sub>2</sub>, Ge, SixNy, SixGaAs, InP, InPSi, GaInAsP, glass, graphite, diamond, mica, SrTiO<sub>3</sub> or the doped modifications thereof, which are nanometrically structured over macroscopic areas. In addn., the invention relates to a method for the prodn. of said surface structured substrates. The invention is based on the film formation of core shell polymer systems whose core areas are selectively modified or charged with corresponding metal compds. in a soln. and construct the structures which are orderly arranged in the thin films. These films which are deposited on the substrate surfaces are selectively etched in such a way that the org. polymer components are completely removed and, as a result, the substrate is decorated in an orderly arrangement by the inorg. residues. The structured films can further serve as masks which make it possible to selectively etch the substrate and to transfer such a structure, said structure given by the film, to the substrate.

IT 1309-37-1P, Iron oxide (Fe<sub>2</sub>O<sub>3</sub>), uses 7439-89-6P,  
Iron, uses  
(prepn. of nanometric metal, metal oxide, and semiconductor  
cluster catalysts)

RN 1309-37-1 HCA

CN Iron oxide (Fe<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7439-89-6 HCA

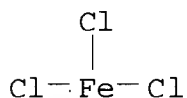
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

IT 7705-08-0, Iron trichloride, uses 16903-35-8,  
Tetrachloroauric acid  
(prepn. of nanometric metal, metal oxide, and semiconductor  
cluster catalysts)

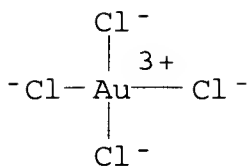
RN 7705-08-0 HCA

CN Iron chloride (FeCl<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)



RN 16903-35-8 HCA

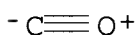
CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)

H<sup>+</sup>

IT 630-08-0, **Carbon monoxide**, reactions  
 (prepn. of nanometric metal, metal oxide, and semiconductor  
 cluster catalysts for oxidn. of)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IC ICM B01J037-00

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction  
 Mechanisms)

Section cross-reference(s): 45

ST nanometric metal oxide semiconductor cluster catalyst; surface  
 structure cluster substrate catalyst; epoxidn alkene nanometric  
 cluster catalyst; **carbon monoxide** oxidn  
 nanometric cluster catalyst; etching polymer film nanometric cluster  
 catalyst prepn

IT Oxidation catalysts

(prepn. of nanometric metal, metal oxide, and semiconductor  
 cluster catalysts for oxidn. of CO)

IT 1307-96-6P, Cobalt monoxide, uses 1308-06-1P, Cobalt oxide (co3o4)  
**1309-37-1P**, Iron oxide (fe2o3), uses 1312-43-2P, Indium  
 oxide(in2o3) 1314-13-2P, Zinc oxide, uses 1314-23-4P, Zirconia,  
 uses 1344-28-1P, Alumina, uses 7429-90-5P, Aluminum, uses  
**7439-89-6P**, Iron, uses 7440-02-0P, Nickel, uses  
 7440-05-3P, Palladium, uses 7440-06-4P, Platinum, uses  
 7440-21-3P, Silicon, uses 7440-22-4P, Silver, uses 7440-31-5P,  
 Tin, uses 7440-32-6P, Titanium, uses 7440-48-4P, Cobalt, uses  
 7440-55-3P, Gallium, uses 7440-56-4P, Germanium, uses  
 7440-57-5P, Gold, uses 7440-66-6P, Zinc, uses 7440-67-7P,  
 Zirconium, uses 7440-74-6P, Indium, uses 13463-67-7P, Titania,  
 uses

(prepn. of nanometric metal, metal oxide, and semiconductor  
 cluster catalysts)

IT 102-54-5, Ferrocene 557-20-0, Diethyl zinc 563-63-3, Silver  
 acetate 688-73-3 3375-31-3, Palladium diacetate 7429-90-5D,  
 Aluminum, alkoxides, uses 7440-21-3D, Silicon, alkoxides, uses  
 7440-32-6D, Titanium, alkoxides, uses 7440-67-7D, Zirconium,

alkoxides, uses 7550-45-0, Titanium tetrachloride, uses 7705-07-9, Titanium trichloride, uses **7705-08-0**, Iron trichloride, uses 7718-54-9, Nickel dichloride, uses 7761-88-8, Silver nitrate, uses 10025-82-8, Indium trichloride 10026-04-7, Silicon tetrachloride 10038-98-9, Germanium tetrachloride 10241-04-0, Cobalt trichloride 13572-93-5, Gallium trihydride 16405-35-9, Zeise's salt **16903-35-8**, Tetrachloroauric acid 16941-12-1, Hexachloroplatinic acid

(prepn. of nanometric metal, metal oxide, and semiconductor cluster catalysts)

IT **630-08-0, Carbon monoxide**, reactions

(prepn. of nanometric metal, metal oxide, and semiconductor cluster catalysts for oxidn. of)

L73 ANSWER 19-OF 36 HCA COPYRIGHT 2003 ACS on STN

130:268842 Gas-phase process and **catalysts** for the selective preparation of acetic acid by oxidation of ethane and/or ethylene. Borchert, Holger; Dingerdissen, Uwe (Hoechst A.-G., Germany). Ger. Offen. DE 19745902 A1 19990422, 8 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1997-19745902 19971017.

AB AcOH is prep'd. in high yield and selectivity by the gas-phase oxidn. of ethane and/or ethylene with oxygen at elevated temps., and with a space-time yield of >150 kg/m<sup>3</sup>h, in the presence of a mixed oxide **catalyst** MoaPdbXcYd (X = .gtoreq.1 of Cr, Mn, Nb, Ta, Ti, V, Te, W; Y = .gtoreq.1 of B, Al, Ga, In, Pt, Zn, Cd, Bi, Ce, Co, Rh, Ir, Cu, Ag, **Au**, **Fe**, Ru, Os, K, Rb, Cs, Mg, Ca, Sr, Ba, Nb, Zr, Hf, Ni, P, Sb, Si, Sn, Tl, U; a = 1; b = 0.0001-0.01; c = 0.4-1; d = 0.005-1).

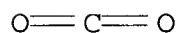
IT **124-38-9P, Carbon dioxide**, preparation

**630-08-0P, Carbon monoxide**, preparation

(gas-phase process and **catalysts** for the selective prep'n. of acetic acid by oxidn. of ethane and/or ethylene)

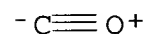
RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IT **7782-44-7, Oxygen**, reactions

(gas-phase process and **catalysts** for the selective prep'n. of acetic acid by oxidn. of ethane and/or ethylene)

RN 7782-44-7 HCA

CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

IT 7439-89-6, Iron, uses 7440-57-5, Gold, uses  
(oxide **catalysts** contg.; gas-phase process and  
**catalysts** for the selective prepn. of acetic acid by  
oxidn. of ethane and/or ethylene)

RN 7439-89-6 HCA  
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA  
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IC ICM C07C053-08  
ICS C07C051-21; C07C051-215; B01J023-64; B01J027-057

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
Section cross-reference(s): 23, 48, 67

ST ethane ethylene oxidn manuf acetic acid; oxidn **catalyst**  
molybdenum palladium manuf acetic acid

IT Steam  
(gas-phase process and **catalysts** for the selective  
prepn. of acetic acid by oxidn. of ethane and/or ethylene and)

IT Oxidation **catalysts**  
(gas-phase; Mo-Pd mixts. for the conversion of ethane and/or  
ethylene in the highly selective manuf. of acetic acid)

IT 124-38-9P, **Carbon dioxide**, preparation  
630-08-0P, **Carbon monoxide**, preparation  
(gas-phase process and **catalysts** for the selective  
prepn. of acetic acid by oxidn. of ethane and/or ethylene)

IT 64-19-7P, Acetic acid, preparation  
(gas-phase process and **catalysts** for the selective  
prepn. of acetic acid by oxidn. of ethane and/or ethylene)

IT 74-82-8, Methane, uses 7727-37-9, Nitrogen, uses  
(gas-phase process and **catalysts** for the selective  
prepn. of acetic acid by oxidn. of ethane and/or ethylene)

IT 7782-44-7, **Oxygen**, reactions  
(gas-phase process and **catalysts** for the  
selective prepn. of acetic acid by oxidn. of ethane and/or  
ethylene)

IT 74-84-0, Ethane, reactions 74-85-1, Ethylene, reactions  
(gas-phase process and **catalysts** for the selective  
prepn. of acetic acid by oxidn. of ethane and/or ethylene)

IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses  
7439-89-6, Iron, uses 7439-92-1, Lead, uses 7439-95-4,  
Magnesium, uses 7439-96-5, Manganese, uses 7439-98-7,

Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1, Niobium, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-09-7, Potassium, uses 7440-16-6, Rhodium, uses 7440-17-7, Rubidium, uses 7440-18-8, Ruthenium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-24-6, Strontium, uses 7440-25-7, Tantalum, uses 7440-26-8, Technetium, uses 7440-28-0, Thallium, uses 7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-39-3, Barium, uses 7440-42-8, Boron, uses 7440-43-9, Cadmium, uses 7440-45-1, Cerium, uses 7440-46-2, Cesium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-55-3, Gallium, uses 7440-57-5, Gold, uses 7440-58-6, Hafnium, uses 7440-61-1, Uranium, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-69-9, Bismuth, uses 7440-70-2, Calcium, uses 7440-74-6, Indium, uses 7723-14-0, Phosphorus, uses (oxide **catalysts** contg.; gas-phase process and **catalysts** for the selective prepn. of acetic acid by oxidn. of ethane and/or ethylene)

L73 ANSWER 20 OF 36 HCA COPYRIGHT 2003 ACS on STN

127:283834 Supported Au **catalysts** prepared from Au phosphine complexes and as-precipitated metal hydroxides: characterization and low-temperature CO oxidation. Yuan, Youzhu; Kozlova, Anguelina P.; Asakura, Kiyotaka; Wan, Huilin; Tsai, Khirui; Iwasawa, Yasuhiro (Department of Chemistry, Graduate School of Science, The University of Tokyo, Hongo, 113, Japan). Journal of Catalysis, 170(1), 191-199 (English) 1997. CODEN: JCTLA5. ISSN: 0021-9517. Publisher: Academic.

AB Supported Au **catalysts** were prepd. by attaching Au phosphine complexes,  $\text{Au}(\text{PPh}_3)(\text{NO}_3)$  (1) and  $[\text{Au}_9(\text{PPh}_3)_8](\text{NO}_3)_3$  (2), on as-pptd. metal hydroxides  $\text{M}(\text{OH})_x^*$  (\*, as-pptd.;  $\text{M} = \text{Mn}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Ti}^{4+}$ ,  $\text{Ce}^{4+}$ , and  $\text{La}^{3+}$ ), followed by temp.-programmed calcination in a flow of dry air. The obtained Au **catalysts** showed high **catalytic** activities in low-temp. CO oxidn. Among the obtained Au **catalysts**  $1/\text{Mn}(\text{OH})_2^*$  and  $1/\text{Co}(\text{OH})_2^*$  were most highly active even at 203 K.  $1/\text{Fe}(\text{OH})_3^*$  and  $1/\text{Ti}(\text{OH})_4^*$  also **catalyzed** CO oxidn. at low temps. 203-273 K, whereas  $1/\text{Fe}_2\text{O}_3$  and  $1/\text{TiO}_2$  prepd. by supporting 1 on conventional  $\text{Fe}_2\text{O}_3$  and  $\text{TiO}_2$  showed negligible activity under the similar reaction conditions. It was estd. by TEM and XRD that the mean diam. of Au particles in  $1/\text{Fe}(\text{OH})_3^*$  was about 2.9 nm, which was about 10 times smaller than that for  $1/\text{Fe}_2\text{O}_3$ . EXAFS for  $1/\text{Ti}(\text{OH})_4^*$  revealed that the coordination no. of Au-Au bond was 8-10, while that for  $1/\text{TiO}_2$  was 11.0, which also indicates that Au particle size for  $1/\text{Ti}(\text{OH})_4^*$  is smaller than that for  $1/\text{TiO}_2$ . The **catalysts** obtained by attaching the Au complexes on com. available metal hydroxides also showed negligible activity for the low-temp. CO oxidn. under identical conditions. These results demonstrate that supported Au **catalysts** with small Au particles, tremendously active for

the low-temp. CO oxidn., can be prepd. by attaching the Au phosphine complexes on the as-pptd. metal hydroxides. Sodium cations exhibited pos. effect on the Au **catalysis**, whereas chloride anions drastically decreased the CO oxidn. activity.

IT 630-08-0, **Carbon monoxide**, reactions  
(supported Au **catalysts** prepd. from Au phosphine complexes and as-pptd. metal hydroxides and characterization and low-temp. CO oxidn.)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O<sup>+</sup>

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)

Section cross-reference(s): 59

ST gold metal hydroxide **catalyst** prepn; **carbon monoxide oxidn** gold **catalyst**

IT Cluster compounds

([Au<sub>9</sub>(PPh<sub>3</sub>)<sub>8</sub>](NO<sub>3</sub>)<sub>3</sub>; supported Au **catalysts** prepd. from Au phosphine complexes and as-pptd. metal hydroxides and characterization and low-temp. CO oxidn.)

IT Oxidation

(**catalytic**; supported Au **catalysts** prepd. from Au phosphine complexes and as-pptd. metal hydroxides and characterization and low-temp. CO oxidn.)

IT Coordination number

Oxidation **catalysts**

Particle size

(supported Au **catalysts** prepd. from Au phosphine complexes and as-pptd. metal hydroxides and characterization and low-temp. CO oxidn.)

IT Hydroxides (inorganic)

(supported Au **catalysts** prepd. from Au phosphine complexes and as-pptd. metal hydroxides and characterization and low-temp. CO oxidn.)

IT 1309-33-7, Iron hydroxide (Fe(OH)<sub>3</sub>) 1309-42-8, Magnesium hydroxide 7440-57-5, Gold, uses 12014-56-1, Cerium(IV) hydroxide 12054-48-7, Nickel hydroxide 14507-19-8, Lanthanum hydroxide 18933-05-6, Manganese hydroxide 20338-08-3, Titanium(IV) hydroxide 20427-58-1, Zinc hydroxide 20427-59-2, Copper hydroxide 21041-93-0, Cobalt(II) hydroxide

(supported Au **catalysts** prepd. from Au phosphine complexes and as-pptd. metal hydroxides and characterization and low-temp. CO oxidn.)

IT 630-08-0, **Carbon monoxide**, reactions

14897-32-6 37336-35-9

(supported Au **catalysts** prepd. from Au phosphine complexes and as-pptd. metal hydroxides and characterization and low-temp. CO oxidn.)

14  
L73 ANSWER 21 OF 36 HCA COPYRIGHT 2003 ACS on STN

127:15206 Preparation and use of gas-containing metal complexes as ~~ultrasound contrast media~~ Bergmann, Martina; Heldmann, Dieter; Suelzle, Detlev; Weitschies, Werner (Schering A.-G., Germany). Ger. Offen. DE 19543077 A1 19970528, 6 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1995-19543077 19951113.

AB The title compds., which are useful esp. in function tests and differential diagnosis, contain at least 1 atom or mol. coordinated in the complex that is gaseous after being released from the complex by means of, e.g., an enzymic or redox reaction. In one example,  $[\text{Ru}(\text{II})(\text{NH}_3)_5\text{N}_2]\text{Br}_2$  is prep'd. by first dissolving 0.2 g  $[\text{Ru}(\text{III})(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$  in 110 mL 0.1N HCl.  $\text{N}_2\text{O}$  then is injected into this soln. over 10 min via 2 wash bottles each contg. 90 mL of 1.25%  $\text{CrCl}_2$  soln. After addn. of 22 mL 1.25%  $\text{CrCl}_2$  soln.,  $\text{N}_2\text{O}$  is introduced for 1 h more, followed by  $\text{O}_2$  for 30 min. After addn. of 40 g  $\text{NaBr}$ , the  $[\text{Ru}(\text{II})(\text{NH}_3)_5\text{N}_2]\text{Br}_2$  ppts. overnight. The ppt. is centrifuged, washed with MeOH and acetone, and dried. Another useful compd.,  $[\text{Ru}(\text{II})(\text{NH}_3)_5\text{N}_2]\text{BF}_4$ , is synthesized analogously.

IT 7782-44-7, Oxygen, reactions  
(gas-contg. metal complexes prepn. as ultrasound contrast agents)

RN 7782-44-7 HCA

CN Oxygen (8CI, 9CI) (CA INDEX NAME)

$\text{O}=\text{O}$

IT 124-38-9DP, Carbon dioxide, metal complexes, biological studies 630-08-0P, Carbon monoxide, biological studies 7439-89-6DP, Iron, complexes, biological studies 7440-57-5DP, Gold, complexes, biological studies 7782-44-7DP, Oxygen, metal complexes, biological studies  
(gas-contg. metal complexes prepn. as ultrasound contrast agents)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

$\text{O}=\text{C}=\text{O}$

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

$-\text{C}\equiv\text{O}^+$

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA  
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)

 $O=O$ 

IC ICM A61K049-00

ICA C07F015-00

CC 9-16 (Biochemical Methods)  
Section cross-reference(s): 14

IT 50-81-7, Ascorbic acid, reactions 64-17-5, Ethanol, reactions  
75-07-0, Acetaldehyde, reactions 110-15-6, Butanedioic acid,  
reactions 110-16-7, 2-Butenedioic acid (Z)-, reactions 110-17-8,  
2-Butenedioic acid (E)-, reactions 328-42-7 490-83-5,  
Dehydroascorbic acid 7647-15-6, Sodium bromide, reactions  
**7782-44-7, Oxygen**, reactions 9007-43-6,  
Cytochrome c, reactions 9035-34-1, Cytochrome a 9035-37-4,  
Cytochrome b 10024-97-2, Laughing gas, reactions 10049-05-5,  
Chromium(II) chloride 13755-29-8, Sodium boron tetrafluoride  
18532-87-1

(gas-contg. metal complexes prepn. as ultrasound  
contrast agents)

IT 57-12-5DP, Cyanide, complexes contg., biological studies  
60-00-4DP, EDTA, complexes contg. 67-42-5DP, complexes contg.  
67-43-6DP, Diethylenetriamine pentaacetic acid, complexes contg.  
71-43-2DP, Benzene, complexes contg., biological studies  
74-85-1DP, Ethene, metal complexes, biological studies 74-86-2DP,  
Acetylene, metal complexes 74-99-7DP, Methyl acetylene, metal  
complexes 93-62-9DP, complexes contg. 106-99-0DP, 1,3-Butadiene,  
metal complexes, biological studies 109-99-9DP, THF, complexes  
contg. 115-07-1DP, 1-Propene, metal complexes, biological studies  
**124-38-9DP, Carbon dioxide**, metal  
complexes, biological studies 139-13-9DP, Nitrilotriacetic acid,  
complexes contg. 302-04-5DP, Thiocyanate, complexes contg.,  
biological studies **630-08-0P, Carbon**  
**monoxide**, biological studies 661-20-1DP, Cyanate,  
complexes contg. 869-52-3DP, Triethylene tetramine  
N,N,N',N'',N'''N'''-hexaacetic acid, complexes contg. 1333-74-0DP,  
Hydrogen, metal complexes, biological studies 3352-57-6DP,  
Hydroxyl, complexes contg., biological studies 4408-81-5DP,  
Propylenediamine tetraacetic acid, complexes contg. 4896-78-0DP,  
complexes contg. 7439-88-5DP, Iridium, complexes, biological



studies 7439-89-6DP, Iron, complexes, biological studies  
 7439-91-0DP, Lanthanum, complexes, biological studies 7439-96-5DP,  
 Manganese, complexes, biological studies 7439-97-6DP, Mercury,  
 complexes, biological studies 7439-98-7DP, Molybdenum, complexes,  
 biological studies 7440-02-0DP, Nickel, complexes, biological  
 studies 7440-03-1DP, Niobium, complexes, biological studies  
 7440-04-2DP, Osmium, complexes, biological studies 7440-05-3DP,  
 Palladium, complexes, biological studies 7440-06-4DP, Platinum,  
 complexes, biological studies 7440-15-5DP, Rhenium, complexes,  
 biological studies 7440-16-6DP, Rhodium, complexes, biological  
 studies 7440-18-8DP, Ruthenium, complexes, biological studies  
 7440-20-2DP, Scandium, complexes, biological studies 7440-22-4DP,  
 Silver, complexes, biological studies 7440-25-7DP, Tantalum,  
 complexes, biological studies 7440-26-8DP, Technetium, complexes,  
 biological studies 7440-32-6DP, Titanium, complexes, biological  
 studies 7440-33-7DP, Tungsten, complexes, biological studies  
 7440-43-9DP, Cadmium, complexes, biological studies 7440-47-3DP,  
 Chromium, complexes, biological studies 7440-48-4DP, Cobalt,  
 complexes, biological studies 7440-50-8DP, Copper, complexes,  
 biological studies 7440-57-5DP, Gold, complexes,  
 biological studies 7440-58-6DP, Hafnium, complexes, biological  
 studies 7440-62-2DP, Vanadium, complexes, biological studies  
 7440-65-5DP, Yttrium, complexes, biological studies 7440-66-6DP,  
 Zinc, complexes, biological studies 7440-67-7DP, Zirconium,  
 complexes, biological studies 7664-41-7DP, Ammonia, complexes  
 contg., biological studies 7727-37-9DP, Nitrogen, complexes  
 contg., biological studies 7727-37-9DP, Nitrogen, metal complexes,  
 biological studies 7732-18-5DP, Water, complexes contg.,  
 biological studies 7782-44-7DP, Oxygen, metal complexes,  
 biological studies 7783-55-3DP, Phosphorus trifluoride, complexes  
 contg. 11062-77-4DP, Superoxide, complexes contg. 12184-88-2DP,  
 Hydride, metal complexes 14343-69-2DP, Azide, complexes contg.  
 14452-93-8DP, Nitrosyl ion, complexes contg. 14797-65-0DP,  
 Nitrite, complexes contg., biological studies 14915-07-2DP,  
 Peroxide (O22-), complexes contg. 15035-72-0DP, Sulfide (HS1-),  
 complexes contg. 15246-25-0P 15283-53-1P 16734-12-6DP, Sulfide  
 (S22-), complexes contg. 16887-00-6DP, Chloride, complexes contg.,  
 biological studies 16984-48-8P, Fluoride, biological studies  
 18851-77-9DP, Nitride, complexes contg. 20461-54-5DP, Iodide,  
 complexes contg., biological studies 23550-45-0DP, S2-, complexes  
 contg., biological studies 24959-67-9DP, Bromide, complexes  
 contg., biological studies 25637-70-1DP, Cyclohexanediamine  
 tetraacetic acid, complexes contg. 29075-95-4DP, Acetylde (HC21-),  
 complexes contg. 32323-01-6DP, Imide, complexes contg.  
 (gas-contg. metal complexes prepn. as ultrasound contrast agents)

L73 ANSWER 22 OF 36 HCA COPYRIGHT 2003 ACS on STN

125:205402 Supported gold **catalysts** derived from gold  
complexes and as-precipitated metal hydroxides, highly active for  
 low-temperature CO oxidation. Yuan, Youzhu;  
 Asakura, Kiyotaka; Wan, Huilin; Tsai, Khirui; Iwasawa, Yasuhiro  
 (Dep. of Chem., Univ. of Tokyo, Tokyo, 113, Japan). Chemistry

Letters (9), 755-756 (English) 1996. CODEN: CMLTAG. ISSN: 0366-7022. Publisher: Nippon Kagakkai.

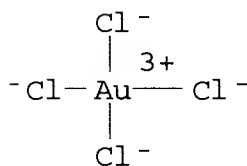
AB Supported gold **catalysts** were prepd. by attaching phosphine-stabilized gold complex and cluster on as-pptd. metal hydroxides  $M(OH) \cdot x$  ( $M = Mn^{2+}$ , **Co<sup>2+</sup>**,  $Fe^{3+}$ ,  $Ni^{2+}$ ,  $Zn^{2+}$ ,  $Mg^{2+}$ , and  $Cu^{2+}$ ), followed by thermal decompn. and calcination. The obtained **catalysts** were remarkably active for **CO oxidn.** at low temps. below 273 K.

IT 16903-35-8

(supported gold **catalysts** derived from gold complexes and as-pptd. metal hydroxides and highly active for low-temp. **CO oxidn.**)

RN 16903-35-8 HCA

CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)



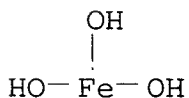
H<sup>+</sup>

IT 1309-33-7P, Iron hydroxide (**Fe(OH)3**)

(supported **gold catalysts** derived from gold complexes and as-pptd. metal hydroxides and highly active for low-temp. **CO oxidn.**)

RN 1309-33-7 HCA

CN Iron hydroxide (**Fe(OH)3**) (8CI, 9CI) (CA INDEX NAME)

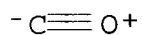


IT 630-08-0, Carbon monoxide, reactions

(supported **gold catalysts** derived from gold complexes and as-pptd. metal hydroxides and highly active for low-temp. **CO oxidn.**)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



CC 67-2 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)

Section cross-reference(s): 59

- ST gold complex metal hydroxide oxidn **catalyst**; cluster gold metal hydroxide oxidn **catalyst**; carbon oxide oxidn supported gold **catalyst**
- IT Clusters  
Oxidation **catalysts**  
(supported gold **catalysts** derived from gold complexes and as-pptd. metal hydroxides and highly active for low-temp. **CO oxidn.**)
- IT \ Hydroxides  
(supported gold **catalysts** derived from gold complexes and as-pptd. metal hydroxides and highly active for low-temp. **CO oxidn.**)
- IT 14243-64-2 14897-32-6 **16903-35-8** 37336-35-9  
(supported gold **catalysts** derived from gold complexes and as-pptd. metal hydroxides and highly active for low-temp. **CO oxidn.**)
- IT 1308-14-1P, Chromium hydroxide (Cr(OH)3) **1309-33-7P**, Iron hydroxide (Fe(OH)3) 1309-42-8P, Magnesium hydroxide 7440-57-5P, Gold, uses 12054-48-7P, Nickel hydroxide 18933-05-6P, Manganese hydroxide 20338-08-3P, Titanium hydroxide (Ti(OH)4) 20427-58-1P, Zinc hydroxide 20427-59-2P, Copper hydroxide 21041-93-0P, Cobalt hydroxide (Co(OH)2) 21645-51-2P, Aluminum hydroxide, uses 59865-92-8P, Vanadium hydroxide (V(OH)3)  
(supported gold **catalysts** derived from gold complexes and as-pptd. metal hydroxides and highly active for low-temp. **CO oxidn.**)
- IT 630-08-0, Carbon monoxide, reactions  
(supported gold **catalysts** derived from gold complexes and as-pptd. metal hydroxides and highly active for low-temp. **CO oxidn.**)
- L73 ANSWER 23 OF 36 HCA COPYRIGHT 2003 ACS on STN  
124:207257 Oxidation of CO to CO2 and manufacture of hydrogen-containing gases for fuel cells. Fujimoto, Tatsuya (Idemitsu Kosan Co, Japan). Jpn. Kokai Tokkyo Koho JP 07315825 A2 19951205 Heisei, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-105735 19940519.
- AB CO is converted into CO2 by selective oxidn. by contacting a gas mixt. contg. CO, O, and 1.0 to 3.0 vol% impurities of methanol, formic acid, and/or formaldehyde with a noble metal **catalysts** (e.g., Au). The CO-contg. gases may be obtained by reforming of methanol. The H-contg. gas for fuel cells is manufd. by contacting a gas product from methanol reforming with noble metal **catalysts** for selective removal of CO by oxidn. of CO to CO2.
- IT 1309-37-1, Ferric oxide, uses 7440-57-5, Gold, uses  
(converting of carbon monoxide in hydrogen from methanol reforming by selective **catalytic** oxidn. for fuel cells)

RN 1309-37-1 HCA  
CN Iron oxide (Fe<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)  
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*  
RN 7440-57-5 HCA  
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 1333-74-0, **Hydrogen, processes**  
(converting of carbon monoxide in hydrogen  
from methanol reforming by selective **catalytic** oxidn.  
for fuel cells)  
RN 1333-74-0 HCA  
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 124-38-9P, **Carbon dioxide, preparation**  
(converting of **carbon monoxide** in hydrogen  
from methanol reforming by selective **catalytic** oxidn.  
for fuel cells)  
RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

IT 7782-44-7, **Oxygen, reactions**  
(converting of **carbon monoxide** in hydrogen  
from methanol reforming by selective **catalytic** oxidn.  
for fuel cells)  
RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

IT 630-08-0, **Carbon monoxide, processes**  
(converting of **carbon monoxide** in hydrogen  
from methanol reforming by selective **catalytic** oxidn.  
for fuel cells)  
RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O<sup>+</sup>

IC ICM C01B031-20  
ICS B01J023-89; C01B003-32; C01B003-58; H01M008-06  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

- ST **carbon monoxide** converting oxidn  
**catalyst**; hydrogen manuf fuel cell
- IT Fuel cells  
(converting of **carbon monoxide** in hydrogen  
from methanol reforming by selective **catalytic** oxidn.  
for fuel cells)
- IT Transition metals, uses  
(nobel; converting of **carbon monoxide** in  
hydrogen from methanol reforming by selective **catalytic**  
oxidn. for fuel cells)
- IT Oxidation **catalysts**  
(noble metals; converting of **carbon monoxide**  
in hydrogen from methanol reforming by selective  
**catalytic** oxidn. for fuel cells)
- IT 1309-37-1, Ferric oxide, uses 7440-57-5, Gold,  
uses  
(converting of **carbon monoxide** in hydrogen  
from methanol reforming by selective **catalytic** oxidn.  
for fuel cells)
- IT 1333-74-0, **Hydrogen**, processes  
(converting of **carbon monoxide** in hydrogen  
from methanol reforming by selective **catalytic** oxidn.  
for fuel cells)
- IT 124-38-9P, **Carbon dioxide**, preparation  
(converting of **carbon monoxide** in hydrogen  
from methanol reforming by selective **catalytic** oxidn.  
for fuel cells)
- IT 7782-44-7, **Oxygen**, reactions  
(converting of **carbon monoxide** in hydrogen  
from methanol reforming by selective **catalytic** oxidn.  
for fuel cells)
- IT 630-08-0, **Carbon monoxide**, processes  
(converting of **carbon monoxide** in hydrogen  
from methanol reforming by selective **catalytic** oxidn.  
for fuel cells)
- IT 64-18-6, Formic acid, miscellaneous 67-56-1, Methanol,  
miscellaneous  
(impurity; converting of **carbon monoxide** in  
hydrogen from methanol reforming by selective **catalytic**  
oxidn. for fuel cells)
- IT 50-00-0, Formaldehyde, occurrence  
(impurity; converting of **carbon monoxide** in  
hydrogen from methanol reforming by selective **catalytic**  
oxidn. for fuel cells)
- L73 ANSWER 24 OF 36 HCA COPYRIGHT 2003 ACS on STN  
124:150607 Manufacture of **hydrogen**-containing **gas**  
for fuel cells. Fujimoto, Tatsuya (Idemitsu Kosan Co, Japan). Jpn.  
Kokai Tokkyo Koho JP 07309603 A2 19951128 Heisei, 8 pp. (Japanese).  
CODEN: JKXXAF. APPLICATION: JP 1994-103075 19940517.
- AB In manuf. of the title **H**-contg. **gases** by  
**catalytic oxidative** conversion of CO to

CO<sub>2</sub> in mixts. of O-contg. **gases** and reformed **gas** mainly contg. CO and CO<sub>2</sub>, the selective oxidn. process is controlled to keep the concns. of O and CO in exhaust **gas** to .gtoreq.0.2 and <2 vol.% and .ltoreq.100 ppm, resp.

IT 1309-37-1, Iron oxide (Fe<sub>2</sub>O<sub>3</sub>), uses 7440-57-5, Gold, uses  
(manuf. of **hydrogen**-contg. **gases** for fuel cells by **catalytic** oxidn. of reformed **gas** and O-contg. **gases**)

RN 1309-37-1 HCA

CN Iron oxide (Fe<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7440-57-5 HCA

CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 124-38-9P, Carbon dioxide, uses  
1333-74-0P, Hydrogen, uses  
(manuf. of **hydrogen**-contg. **gases** for fuel cells by **catalytic** oxidn. of reformed **gas** and O-contg. **gases**)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 630-08-0, Carbon monoxide, reactions  
(manuf. of **hydrogen**-contg. **gases** for fuel cells by **catalytic** oxidn. of reformed **gas** and O-contg. **gases**)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O<sup>+</sup>

IC ICM C01B003-50

ICS C01B003-38; C01B031-20; H01M008-06

CC 51-6 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 52, 67

ST **hydrogen** contg **gas** manuf; **catalytic**  
oxidn reformed **gas**; fuel cell **hydrogen gas** manuf

- IT Fuel cells  
 Fuel gas manufacturing  
 (manuf. of **hydrogen-contg. gases** for fuel cells by **catalytic** oxidn. of reformed **gas** and **O-contg. gases**)
- IT 1309-37-1, Iron oxide (Fe<sub>2</sub>O<sub>3</sub>), uses 7440-57-5, Gold, uses  
 (manuf. of **hydrogen-contg. gases** for fuel cells by **catalytic** oxidn. of reformed **gas** and **O-contg. gases**)
- IT 124-38-9P, Carbon dioxide, uses  
 1333-74-0P, Hydrogen, uses  
 (manuf. of **hydrogen-contg. gases** for fuel cells by **catalytic** oxidn. of reformed **gas** and **O-contg. gases**)
- IT 630-08-0, Carbon monoxide, reactions  
 (manuf. of **hydrogen-contg. gases** for fuel cells by **catalytic** oxidn. of reformed **gas** and **O-contg. gases**)
- IT 1344-28-1, Alumina, uses  
 (support; manuf. of **hydrogen-contg. gases** for fuel cells by **catalytic** oxidn. of reformed **gas** and **O-contg. gases**)

L73 ANSWER 25 OF 36 HCA COPYRIGHT 2003 ACS on STN

124:120926 **Carbon monoxide** detectors. Kubota, Kazunari; Inoe, Fumihito (Fuji Electric Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 07294473 A2 19951110 Heisei, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-61829 19940331. PRIORITY: JP 1994-31683 19940302.

AB The CO detectors are composed of a gas-detecting element comprising Pt wire with Ti Fe oxide support and Au catalyst, a compensating element comprising Pt wire with Ti Fe oxide support and Cu oxide, Ni oxide, or Mn oxide oxidn. **catalyst**, and a bridged circuit. The detectors have low sensitivity to EtOH vapor.

IT 630-08-0, Carbon monoxide, analysis  
 (CO detectors)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O<sup>+</sup>

IC ICM G01N027-12

CC 47-8 (Apparatus and Plant Equipment)

ST carbon monoxide detector

IT Sensors

(CO<sub>2</sub> detectors)

IT 630-08-0, Carbon monoxide, analysis  
 (CO detectors)

IT 12789-64-9, Iron titanium oxide

(**catalyst** support; CO detectors with)  
 IT 1344-70-3, Copper oxide 7440-57-5, Gold, uses 11099-02-8, Nickel  
 oxide 11129-60-5, Manganese oxide  
 (**catalyst**; CO detectors with)

L73 ANSWER 26 OF 36 HCA COPYRIGHT 2003 ACS on STN

123:125470 Oxidation of methane on a Au + SrFeO<sub>3</sub>- $\delta$ //YSZ electrode  
 characterized by mass spectroscopy and 18O<sub>2</sub> pulses. Norby, Truls;  
 Middleton, Peter Hugh; Hansen, Eddy W.; Dahl, Ivar; Andersen,  
 Arnfinn G. (Centre Materials Research, Univ., Oslo, Oslo, N-0371,  
 Norway). Chemical Engineering & Technology, 18(2), 139-47 (English)  
 1995. CODEN: CETEER. ISSN: 0930-7516. Publisher: VCH.

AB A solid state electrochem. reactor is described in which reactants  
 can be oxidized at high temps. over an anode/**catalyst**  
 using **co-fed oxygen gas** as well as  
 electrochem. supplied oxygen. The setup permits injection of  
 isotopic pulses in the reactant streams. The compn. and isotopic  
 distribution in the products are recorded with a quadrupole mass  
 spectrometer. The use of the system is exemplified by oxidn. of  
 methane over a Au + SrFeO<sub>3</sub>- $\delta$ //YSZ anode at 800-850.degree..  
 Pulses of 18O<sub>2</sub> in the **stream** of **co-fed**  
**O<sub>2</sub>** were used to study the reactivity and products of  
**gaseous oxygen** as distinguished from the  
 electrochem. supplied oxygen. The anode used supports oxygen  
 pumping, but is only moderately active for methane oxidn. The  
 products are mainly CO and **CO<sub>2</sub>**. The content of 18O in the  
 products is low, indicating that methane oxidn. takes place by  
 16O-rich lattice oxygen. In comparison, a ref. Au//YSZ electrode is  
 a slower anode for oxygen pumping, but a better **catalyst**  
 for the reaction between CH<sub>4</sub> and gaseous **O<sub>2</sub>**, seemingly  
 involving adsorbed oxygen.

IT 7440-57-5, Gold, uses 12022-69-4D, Iron strontium  
 oxide fesro3, **oxygen**-deficient  
 (**oxidn.** of methane on Au + SrFeO<sub>3</sub>- $\delta$ //YSZ  
 electrode characterized by mass spectroscopy and 18O<sub>2</sub> pulses)

RN 7440-57-5 HCA  
 CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

RN 12022-69-4 HCA  
 CN Iron strontium oxide (FeSrO<sub>3</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O	3	17778-80-2
Sr	1	7440-24-6
Fe	1	7439-89-6

IT 124-38-9P, Carbon dioxide, properties

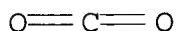


**630-08-0P, Carbon monoxide, properties**

(prepn. in oxidn. of methane on Au + SrFeO<sub>3</sub>-.delta.//YSZ  
electrode characterized by mass spectroscopy and 1802 pulses)

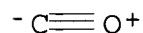
RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)

Section cross-reference(s): 51

IT Isotope indicators

(**oxygen-18**; in **oxidn.** of methane on Au +  
SrFeO<sub>3</sub>-.delta.//YSZ electrode characterized by mass spectroscopy  
and 1802 pulses)

IT Oxidation **catalysts**

(electrochem., gold for methane)

IT **7440-57-5**, Gold, uses **12022-69-4D**, Iron strontium  
oxide feso<sub>3</sub>, **oxygen-deficient**

(**oxidn.** of methane on Au + SrFeO<sub>3</sub>-.delta.//YSZ  
electrode characterized by mass spectroscopy and 1802 pulses)

IT **124-38-9P, Carbon dioxide, properties**

**630-08-0P, Carbon monoxide, properties**

(prepn. in oxidn. of methane on Au + SrFeO<sub>3</sub>-.delta.//YSZ  
electrode characterized by mass spectroscopy and 1802 pulses)

L73 ANSWER 27 OF 36 HCA COPYRIGHT 2003 ACS on STN

123:87829 **Carbon dioxide and carbon  
monoxide hydrogenation over gold**

supported on titanium, **iron**, and zinc oxides. Sakurai,  
Hiroaki; Haruta, Masatake (Osaka National Research Institute, AIST,  
1-8-31 Midorigaoka, Ikeda, 563, Japan). Applied Catalysis, A:  
General, 127(1-2), 93-105 (English) 1995. CODEN: ACAGE4. ISSN:  
0926-860X. Publisher: Elsevier.

AB Highly dispersed gold deposited on TiO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub>, ZnO, and ZnFe<sub>2</sub>O<sub>4</sub> was  
active for the **hydrogenation** of both **CO<sub>2</sub>** and CO

at 150-400.degree.. MeOH was produced more readily from **CO<sub>2</sub>**  
than from CO. Esp., Au/ZnO and Au/ZnFe<sub>2</sub>O<sub>4</sub> showed high MeOH  
selectivities from **CO<sub>2</sub>**, which were comparable to those

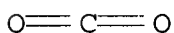
obtained for Cu **catalysts**. As for MeOH synthesis from CO,  
only Au/ZnO gave appreciable yields with similar selectivity as Cu  
**catalysts**. Comparison between exptl. and thermodyn. data  
proved that over all the **catalysts**, except for Au/TiO<sub>2</sub>,  
three reactions, namely between **CO<sub>2</sub>** and MeOH, between CO  
and MeOH, and between **CO<sub>2</sub>** and CO, simultaneously reached  
equil. at >300.degree.; the MeOH yield decreased with further

increases in temp. Hydrocarbons were formed at high temps. and the resulting water was also involved in the above equil. As a main hydrocarbon product, CH<sub>4</sub> was obtained much more selectively from CO<sub>2</sub> than from CO. Ethane and propane were also produced from CO<sub>2</sub> and CO over **gold** supported on reduced **iron** oxides.

IT 124-38-9, **Carbon dioxide**, reactions  
 630-08-0, **Carbon monoxide**, reactions  
 (hydrogenation; hydrogenation of CO and  
 CO<sub>2</sub> over metal oxide-supported gold **catalysts**)

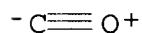
RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
 Section cross-reference(s): 67

ST gold **carbon monoxide hydrogenation catalyst**; **carbon dioxide gold hydrogenation catalyst**; methanol gold carbon oxide **hydrogenation**; hydrocarbon gold carbon oxide **hydrogenation**

IT **Hydrogenation catalysts**  
 (hydrogenation of CO and CO<sub>2</sub> over metal  
 oxide-supported gold **catalysts**)

IT 74-82-8, Methane, formation (nonpreparative) 74-84-0, Ethane,  
 formation (nonpreparative) 74-98-6, Propane, formation  
 (nonpreparative)

(formation; **hydrogenation** of CO and CO<sub>2</sub> over  
 metal oxide-supported gold **catalysts**)

IT 7440-57-5, Gold, uses  
 (hydrogenation of CO and CO<sub>2</sub> over metal  
 oxide-supported gold **catalysts**)

IT 124-38-9, **Carbon dioxide**, reactions  
 630-08-0, **Carbon monoxide**, reactions  
 (hydrogenation; hydrogenation of CO and  
 CO<sub>2</sub> over metal oxide-supported gold **catalysts**)

IT 67-56-1P, Methanol, preparation  
 (major product; **hydrogenation** of CO and CO<sub>2</sub>  
 over metal oxide-supported gold **catalysts**)

IT 1309-37-1, Ferric oxide, uses 1314-13-2, Zinc oxide, uses  
 12063-19-3, Iron zinc oxide (ZnFe<sub>2</sub>O<sub>4</sub>) 13463-67-7, Titanium  
 dioxide, uses

(support; **hydrogenation** of CO and CO<sub>2</sub> over  
 metal oxide-supported gold **catalysts**)

L73 ANSWER 28 OF 36 HCA COPYRIGHT 2003 ACS on STN

120:201527 Application of supported gold **catalysts** in environmental problems. Tsubota, Susumu; Ueda, Atsushi; Sakurai, Hiroaki; Kobayashi, Tetsuhiko; Haruta, Masatake (Gov. Ind. Res. Inst. Osaka, Midorigaoka, 563, Japan). ACS Symposium Series, 552 (Environmental Catalysis), 420-8 (English) 1994. CODEN: ACSMC8. ISSN: 0097-6156.

AB Small gold particles deposited on metal oxides exhibit extraordinarily high catalytic activities at low temps. For example, Au/.alpha.-Fe2O3 can **catalyze** the **oxidn.** of CO at a temp. as low as -70.degree.. The reaction is not retarded but accelerated by moisture contained in reaction gases. These unique properties of supported gold **catalysts** show a potential of their applications in a variety of environmental problems. The **catalytic** nature of supported gold depends on the kind of metal oxide supports. The suitable supports which the authors found are NiFe2O4 for NOx redn. by CO and for the oxidn.-decompn. of trimethylamine, Co3O4 for the complete oxidn. of CH4 and C3H8, Al2O3 for NOx redn. by C3H6 in the presence of O2 and H2O, and ZnO for CO2 **hydrogenation** to methanol.

IT 1309-37-1, Iron oxide(fe2o3), uses 12168-54-6, Iron nickel oxide(fe2nio4) (**catalysts** from gold and, for environmental applications)

RN 1309-37-1 HCA

CN Iron oxide (Fe2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 12168-54-6 HCA

CN Iron nickel oxide (Fe2NiO4) (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 7440-57-5, Gold, uses (**catalysts**, for environmental applications)

RN 7440-57-5 HCA

CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 124-38-9, Carbon dioxide, reactions (hydrogenation of, gold **catalysts** for)

RN 124-38-9 HCA

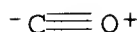
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

IT 630-08-0, Carbon monoxide, reactions (redn. of nitrogen oxide by, gold **catalysts** for)

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IT 7782-44-7, Oxygen, reactions  
(redn. of nitrogen oxide in presence of, gold **catalysts**  
for)  
RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)



CC 67-2 (Catalysis, Reaction Kinetics, and Inorganic Reaction  
Mechanisms)  
Section cross-reference(s): 59.  
ST gold **catalyst** environmental application  
IT **Catalysts and Catalysis**  
Combustion **catalysts**  
Decomposition **catalysts**  
**Hydrogenation catalysts**  
Oxidation **catalysts**  
Reduction **catalysts**  
(gold, for environmental applications)  
IT 1308-06-1, Cobalt oxide( $\text{Co}_3\text{O}_4$ ) 1309-37-1, Iron  
oxide( $\text{Fe}_2\text{O}_3$ ), uses 1309-48-4, Magnesium oxide, uses 1314-13-2,  
Zinc oxide, uses 1344-28-1, Alumina, uses 12168-54-6,  
Iron nickel oxide( $\text{Fe}_2\text{NiO}_4$ ) 13463-67-7, Titania, uses  
(**catalysts** from gold and, for environmental  
applications)  
IT 7440-57-5, Gold, uses  
(**catalysts**, for environmental applications)  
IT 124-38-9, Carbon dioxide, reactions  
(**hydrogenation** of, gold **catalysts** for)  
IT 74-82-8, Methane, reactions 74-98-6, Propane, reactions  
(oxidn. of, gold **catalysts** for)  
IT 75-50-3, Trimethylamine, reactions  
(oxidn.-decompn. of, gold **catalysts** for)  
IT 115-07-1, Propene, reactions 630-08-0, Carbon  
**monoxide**, reactions  
(redn. of nitrogen oxide by, gold **catalysts** for)  
IT 7732-18-5, Water, reactions 7782-44-7, Oxygen, reactions  
(redn. of nitrogen oxide in presence of, gold **catalysts**  
for)  
IT 11104-93-1, Nitrogen oxide, reactions  
(redn. of, gold **catalysts** for)  
L73 ANSWER 29 OF 36 HCA COPYRIGHT 2003 ACS on STN  
118:155350 Process of removing and concentrating desired molecules from  
solutions. Bradshaw, Jerald S.; Tarbet, Bryon J.; Bruening, Ronald  
L.; Izatt, Reed M. (Brigham Young University, USA). Can. Pat. Appl.  
CA 2030596 AA 19920524, 46 pp. (English). CODEN: CPXXEB.

APPLICATION: CA 1990-2030596 19901123.

AB A method is disclosed for the quant. removal and concn. of desired mols. or ions, such as gases, anions, and amino acids, from a source soln. which may contain larger concns. of other mols. The method comprises bringing the source soln. into contact with a solid cation-ligand-matrix consisting of a cation complexed to a ligand mol. covalently bonded to a matrix consisting of an org. spacer bonded to a solid inorg. support through a Si atom. The cation has an affinity for the desired mols. to form a complex between the desired mols. and the cation portion of the solid cation-ligand-matrix at binding sites initially held by H<sub>2</sub>O or other weakly coordinated ligands or via ion pairing. The desired mol. complex is broken, releasing either the desired mols. or desired mols. complexed with the cation, by contacting the solid cation-ligand-matrix-desired mol. complex with a much smaller vol. of a receiving soln. in which said desired mols. are sol. The concd. ions or mols. thus removed may be analyzed and/or recovered by known methods. The process is useful in measuring the concns. of mols. originally present at ppb levels; in the removal of low levels of toxic mols., such as NH<sub>3</sub> or anions such as CrO<sub>4</sub><sup>2-</sup> from potable and saline water; in the prepn. of ultrapure salts and gases; and in the recovery of valuable mols. present in low concns., as in the sepn. of amino acids, etc.

IT 7439-89-6D, Iron, compds. with ligands, reaction products with organosilicon-modified oxides 7440-57-5D, Gold, compds. with ligands, reaction products with organosilicon-modified oxides

(for sepn. and concn. of mols. from solns.)

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-57-5 HCA

CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 124-38-9P, Carbon dioxide, preparation

630-08-0P, Carbon monoxide, preparation

7782-44-7P, Oxygen, preparation

(sepn. and concn. of solvated gas of, metal complexes bound to organosilicon-modified oxide supports for)

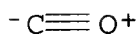
RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

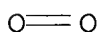
RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 7782-44-7 HCA

CN Oxygen (8CI, 9CI) (CA INDEX NAME)



IC ICM C07C227-40

ICS C07C007-152; C07C209-84; C07F007-10; C07F015-00; B01J045-00;  
B01J039-04

CC 66-4 (Surface Chemistry and Colloids)

Section cross-reference(s): 34, 48, 61, 78, 79, 80

IT 107-15-3D, 1,2-Ethanediamine, reaction products with  
organosilicon-modified oxide, metal compds. 112-24-3D, reaction  
products with organosilicon-modified oxide, metal compds.  
1314-23-4D, Zirconium dioxide, modified with organosilicon compds.,  
metal complexes 1344-28-1D, Alumina, modified with organosilicon  
compds., metal complexes 1344-57-6D, Uranium dioxide, compds. with  
ligands, reaction products with organosilicon-modified oxides  
1760-24-3D, reaction products with oxides, metal compds.  
2530-83-8D, 3-Glycidoxypentyltrimethoxysilane, reaction products  
with oxides, metal compds. 4420-74-0D, 3-  
Mercaptopentyltrimethoxysilane, reaction products with oxides, metal  
compds. 7429-90-5D, Aluminum, compds. with ligands, reaction  
products with organosilicon-modified oxides 7439-88-5D, Iridium,  
compds. with ligands, reaction products with organosilicon-modified  
oxides 7439-89-6D, Iron, compds. with ligands, reaction  
products with organosilicon-modified oxides 7439-91-0D, Lanthanum,  
compds. with ligands, reaction products with organosilicon-modified  
oxides 7439-92-1D, Lead, compds. with ligands, reaction products  
with organosilicon-modified oxides 7439-96-5D, Manganese, compds.  
with ligands, reaction products with organosilicon-modified oxides  
7439-97-6D, Mercury, compds. with ligands, reaction products with  
organosilicon-modified oxides 7440-02-0D, Nickel, compds. with  
ligands, reaction products with organosilicon-modified oxides  
7440-05-3D, Palladium, compds. with ligands, reaction products with  
organosilicon-modified oxides 7440-06-4D, Platinum, compds. with  
ligands, reaction products with organosilicon-modified oxides  
7440-18-8D, Ruthenium, compds. with ligands, reaction products with  
organosilicon-modified oxides 7440-22-4D, Silver, compds. with  
ligands, reaction products with organosilicon-modified oxides  
7440-28-0D, Thallium, compds. with ligands, reaction products with  
organosilicon-modified oxides 7440-43-9D, Cadmium, compds. with  
ligands, reaction products with organosilicon-modified oxides  
7440-45-1D, Cerium, compds. with ligands, reaction products with  
organosilicon-modified oxides 7440-47-3D, Chromium, compds. with  
ligands, reaction products with organosilicon-modified oxides  
7440-48-4D, Cobalt, compds. with ligands, reaction products with

organosilicon-modified oxides 7440-50-8D, Copper, compds. with ligands, reaction products with organosilicon-modified oxides 7440-55-3D, Gallium, compds. with ligands, reaction products with organosilicon-modified oxides **7440-57-5D**, Gold, compds. with ligands, reaction products with organosilicon-modified oxides 7440-66-6D, Zinc, compds. with ligands, reaction products with organosilicon-modified oxides 7440-69-9D, Bismuth, compds. with ligands, reaction products with organosilicon-modified oxides 7631-86-9D, Silicon dioxide, modified with organosilicon compds., metal complexes 11099-02-8D, Nickel oxide, modified with organosilicon compds., metal complexes 13463-67-7D, Titanium dioxide, modified with organosilicon compds., metal complexes 13822-56-5D, 3-Aminopropyltrimethoxysilane, reaction products with oxides, metal compds. 16056-34-1D, compds. with ligands, reaction products with organosilicon-modified oxides 22408-96-4D, reaction products with oxides, metal compds. 24413-04-5D, p-(Chloromethyl)phenyltrimethoxysilane, reaction products with oxides, metal compds. 26914-40-9D, Ethanedithiol, reaction products with organosilicon-modified oxide, metal compds.

(for sepn. and concn. of mols. from solns.)

- IT 74-85-1P, Ethene, preparation 115-07-1P, 1-Propene, preparation **124-38-9P, Carbon dioxide**, preparation **630-08-0P, Carbon monoxide**, preparation 7446-09-5P, Sulfur dioxide, preparation 7446-11-9P, Sulfur trioxide, preparation 7664-41-7P, Ammonia, preparation 7727-37-9P, Nitrogen, preparation **7782-44-7P, Oxygen**, preparation 10024-97-2P, Nitrous oxide, preparation  
(sepn. and concn. of solvated gas of, metal complexes bound to organosilicon-modified oxide supports for)

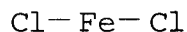
L73 ANSWER 30 OF 36 HCA COPYRIGHT 2003 ACS on STN

115:79852 Catalytic-active ferrite plating films with gold particles dispersed. Itoh, T.; Demura, M.; Abe, M.; Tamaura, Y. (Dep. Phys. Electron., Tokyo Inst. Technol., Tokyo, 152, Japan). Journal of Applied Physics, 69(8, Pt. 2A), 4913-15 (English) 1991. CODEN: JAPIAU. ISSN: 0021-8979.

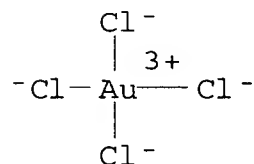
AB Ferrite films of Fe<sub>3</sub>O<sub>4</sub> and .alpha.-Fe<sub>2</sub>O<sub>4</sub> were prepd., in which Au fine particles (which exhibit **catalytic** activity for CO .fwdarw. CO<sub>2</sub> oxidn.) are dispersed by ferrite plating in an aq. solns. below 100.degree.C. As-reaction soln. FeCl<sub>2</sub> (Fe<sup>2+</sup> + Cl<sup>-</sup>) was used, and the soln. **HAuCl<sub>4</sub>** (H<sup>+</sup> + AuCl<sub>4</sub><sup>-</sup>) was used as oxidizing soln. The redn.-oxidn. reaction between Fe<sup>2+</sup> and AuCl<sup>-</sup> facilitates the ferrite formation and also Au-particle formation reactions. The Au particles were apprx.30 nm in diam. Among all the prepd. films an .alpha.-Fe<sub>2</sub>O<sub>4</sub> film contg. Au fine particles at an at. ratio Au/Fe = 0.12 exhibited the highest oxidn. activity, which appeared above 100.degree.C, and converted the CO gas to CO<sub>2</sub> completely at 200.degree.C.

IT **7758-94-3, Iron dichloride 16903-35-8**  
(in prepn. of gold-dispersed ferrite film as oxidn. catalysts)

RN 7758-94-3 HCA  
 CN Iron chloride ( $\text{FeCl}_2$ ) (8CI, 9CI) (CA INDEX NAME)



RN 16903-35-8 HCA  
 CN Aurate(1-), tetrachloro-, hydrogen, (SP-4-1)- (9CI) (CA INDEX NAME)



IT 1317-61-9, Iron oxide ( $\text{Fe}_3\text{O}_4$ ), uses and miscellaneous  
 (oxidn. **catalyst** from gold particle dispersed in  
 ferrite film contg.)

RN 1317-61-9 HCA  
 CN Iron oxide ( $\text{Fe}_3\text{O}_4$ ) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

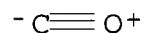
IT 1309-37-1, Iron oxide ( $\text{Fe}_2\text{O}_3$ ), uses and miscellaneous  
 (oxidn. **catalyst** from gold particle dispersed in  
 ferrite film contg. .gamma.-)

RN 1309-37-1 HCA  
 CN Iron oxide ( $\text{Fe}_2\text{O}_3$ ) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 630-08-0, Carbon monoxide, reactions  
 (oxidn. of, gold-dispersed ferrite film  
**catalyst** for)

RN 630-08-0 HCA  
 CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction  
 Mechanisms)

Section cross-reference(s): 77

ST gold dispersed ferrite film; oxidn **catalyst** ferrite gold  
 dispersion

IT Oxidation **catalysts**  
 (gold particle-dispersed ferrite film, ferrite plating technique  
 in prepn. of)

IT 7758-94-3, Iron dichloride 16903-35-8  
 (in prepn. of gold-dispersed ferrite film as oxidn.)



**catalysts)**

- IT 7440-57-5, Gold, uses and miscellaneous  
(oxidn. **catalyst** from dispersed, in ferrite film,)
- IT 1317-61-9, Iron oxide (Fe<sub>3</sub>O<sub>4</sub>), uses and miscellaneous  
(oxidn. **catalyst** from gold particle dispersed in  
ferrite film contg.)
- IT 1309-37-1, Iron oxide (Fe<sub>2</sub>O<sub>3</sub>), uses and miscellaneous  
(oxidn. **catalyst** from gold particle dispersed in  
ferrite film contg. .gamma.-)
- IT 630-08-0, **Carbon monoxide**, reactions  
(oxidn. of, gold-dispersed ferrite film  
**catalyst** for)

L73 ANSWER 31 OF 36 HCA COPYRIGHT 2003 ACS on STN

112:237204 Membranes for reactors for mobile-atom insertion reactions.  
Ayers, William (USA). U.S. US 4908114 A 19900313, 17 pp. Division  
of U.S. Ser. No. 780,870, abandoned. (English). CODEN: USXXAM.  
APPLICATION: US 1987-117298 19871106. PRIORITY: US 1985-780870  
19850927.

AB HCO<sub>2</sub>H and MeOH from CO<sub>2</sub>, and H<sub>2</sub>O<sub>2</sub> from O). Insertion  
reactions (e.g., prodn. of NH<sub>3</sub> and N<sub>2</sub>H<sub>4</sub> from N) are carried out at  
using bipolar mobile-atom transmissive membranes comprising mobile  
atom pumps, conductive atom-transmissive media on 1 surface, and  
conductive atom transmissive media on the opposite surface, across  
which the mobile atom diffuses as to the reaction side of the  
membrane. The insertion-reaction side of the membrane is pos.  
biased with respect to a counterelectrode, so that reactant mols.  
are electrosorbed on that surface. The electrosorbed mol. reacts  
with the surface atoms (e.g. H) by insertion to form reduced  
products. A reactor diagram is presented.

IT 7439-89-6, Iron, uses and miscellaneous 7440-57-5,  
Gold, uses and miscellaneous  
(**catalysts**, for hydrogen formation in atom-transmissive  
membranes)

RN 7439-89-6 HCA  
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

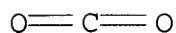
Fe

RN 7440-57-5 HCA  
CN Gold (8CI, 9CI) (CA INDEX NAME)

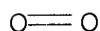
Au

IT 124-38-9, **Carbon dioxide**, reactions  
7782-44-7, Oxygen, reactions  
(hydrogen insertion in, atom-transmissive membranes for)

RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



RN 7782-44-7 HCA  
CN Oxygen (8CI, 9CI) (CA INDEX NAME)



IT 1333-74-0  
(**hydrogenation**, of nitrogen, **carbon monoxide** and oxygen, atom-transmissive membranes for)  
RN 1333-74-0 HCA  
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)



IC ICM C25B013-00  
ICS C25B009-00; C25B011-00  
NCL 204252000  
CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
Section cross-reference(s): 23, 47, 49, 72  
ST ammonia manuf insertion membrane; insertion reaction membrane atom transmission; hydrazine manuf insertion membrane; nitrogen **hydrogenation** atom transmission membrane  
IT **Hydrogenation**  
(of nitrogen, **carbon monoxide** and oxygen, atom-transmissive membranes for)  
IT 7440-62-2, Vanadium, uses and miscellaneous  
(**catalysts**, for hydride formation in atom-transmissive membranes)  
IT 7439-89-6, Iron, uses and miscellaneous 7439-92-1, Lead, uses and miscellaneous 7440-06-4, Platinum, uses and miscellaneous 7440-22-4, Silver, uses and miscellaneous 7440-25-7, Tantalum, uses and miscellaneous 7440-33-7, Tungsten, uses and miscellaneous 7440-47-3, Chromium, uses and miscellaneous 7440-57-5, Gold, uses and miscellaneous 7440-74-6, Indium, uses and miscellaneous  
(**catalysts**, for hydrogen formation in atom-transmissive membranes)  
IT 124-38-9, **Carbon dioxide**, reactions  
7727-37-9, Nitrogen, reactions 7782-44-7, Oxygen, reactions  
(hydrogen insertion in, atom-transmissive membranes for)  
IT 1333-74-0  
(**hydrogenation**, of nitrogen, **carbon monoxide** and oxygen, atom-transmissive membranes for)  
IT 64-18-6P, Formic acid, preparation 67-56-1P, Methanol, preparation  
(manuf. of, from **carbon dioxide**, atom-transmissive membranes for)

L73 ANSWER B2 OF 36 HCA COPYRIGHT 2003 ACS on STN

108:55325 Adsorption, decomposition and surface reactions of methyl chloride on metal films of **iron**, nickel, palladium, lead, **gold** and copper. Ali, Abdul Karim Mohammed; Saleh, Jalal Mohammed; Hikmat, Naema Ahmad (Coll. Sci., Univ. Baghdad, Baghdad, Iraq). Journal of the Chemical Society, Faraday Transactions 1: Physical Chemistry in Condensed Phases, 83(8), 2391-406 (English) 1987. CODEN: JCFTAR. ISSN: 0300-9599.

AB Adsorption and decompn. of CH<sub>3</sub>Cl on metal films of **Fe**, Ni, Pd, Pb, **Au**, and Cu are examd. at 193-570 K. Both mol. and dissociative adsorption of CH<sub>3</sub>Cl occurred on all films at 193 K. Above 300 K the dissociative chemisorption of CH<sub>3</sub>Cl on all the films was accompanied by the evolution of CH<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, and **H<sub>2</sub>** together with some C<sub>2</sub>H<sub>4</sub> on **Fe**, Ni, Pb, and **Au**. The gaseous products subsequent to CH<sub>3</sub>Cl adsorption on the oxidized films of Fe, Ni, Pd, Pb, and Cu above 350 K involved CH<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, **H<sub>2</sub>**, and **CO gases**. The structure of the surface phase was represented as C<sub>n</sub>H<sub>m</sub>Cl and the min. values of the ratio m/n on **Fe**, Ni, Pd, **Au** and Cu were 2.69-2.93, but remained as 2.1 on Pb, indicating the existence of CH<sub>3</sub> and CH<sub>2</sub> radicals on the surface. Further support for the surface species was derived from the results of CH<sub>3</sub>Cl adsorption on Fe and Ni films which had been satd. with deuterium. No HCl, CH<sub>2</sub>O, CH<sub>3</sub>OH, H<sub>2</sub>O, **CO<sub>2</sub>**, or other gases were obsd. at any stage, and the adsorption of chlorine atoms, resulting from CH<sub>3</sub>Cl decompn., on the film surface was accompanied by some incorporation in the bulk of the metal. The kinetic data revealed the direct dependence of the reaction rate on CH<sub>3</sub>Cl pressure and the operation of a compensation effect throughout the interaction of CH<sub>3</sub>Cl with various surfaces. On the basis of such a compensation and the linearity of the relation existing between the activation energies (E<sub>a</sub>) and the preexponential factors of the rate equation, it was possible to arrange the clean and oxidized films in the order of decreasing activity towards CH<sub>3</sub>Cl adsorption and decompn. An attempt was also made to est. the enthalpy changes assocd. with the dissociative adsorption of CH<sub>3</sub>Cl on various surfaces, as well as for the subsequent reactions of the resulting species on the basis of the std. enthalpy involved in the resp. processes.

IT 7782-44-7, Dioxygen, properties  
(adsorption of, on metal films)

RN 7782-44-7 HCA

CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

IT 1333-74-0, Dihydrogen, properties  
(adsorption of, on metal or metal oxide films)

RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 7440-57-5, Gold, uses and miscellaneous  
(**catalyst** film, for decompn. of Me chloride, kinetics  
and mechanism with)  
RN 7440-57-5 HCA  
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 7439-89-6, Iron, uses and miscellaneous  
(**catalyst** film, for decompn. of Me chloride, kinetics  
and mechanism with)  
RN 7439-89-6 HCA  
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

CC 22-8 (Physical Organic Chemistry)  
IT Decomposition **catalysts**  
(metal or metal oxide films, for Me chloride, kinetics and  
mechanism with)  
IT 7782-44-7, Dioxygen, properties  
(adsorption of, on metal films)  
IT 1333-74-0, Dihydrogen, properties 7439-90-9, Krypton,  
properties  
(adsorption of, on metal or metal oxide films)  
IT 1332-37-2, Iron oxide, uses and miscellaneous 7439-92-1, Lead,  
uses and miscellaneous 7440-02-0, Nickel, uses and miscellaneous  
7440-05-3, Palladium, uses and miscellaneous 7440-50-8, Copper,  
uses and miscellaneous 7440-57-5, Gold, uses and  
miscellaneous  
(**catalyst** film, for decompn. of Me chloride, kinetics  
and mechanism with)  
IT 1335-25-7, Lead oxide 1344-70-3, Copper oxide 7439-89-6,  
Iron, uses and miscellaneous 11099-02-8, Nickel oxide  
11113-77-2, Palladium oxide  
(**catalyst** film, for decompn. of Me chloride, kinetics  
and mechanism with)

L73 ANSWER 33 OF 36 HCA COPYRIGHT 2003 ACS on STN  
104:58456 Hydrogen insertion reaction for synthesis of reduced,  
~~hydrogenated compounds.~~ Ayers, William (Energy Conversion  
Devices, Inc., USA). U.S. US 4547273 A 19851015, 17 pp.  
(English). CODEN: USXXAM. APPLICATION: US 1984-618014 19840607.  
AB The insertion reactions are carried out at a bipolar mobile atom  
transmissive membrane formed of a H pump material consisting of Pd,  
Ti, and their alloys and hydrides, and conductive atom means on both

sides of the membrane. The mobile atom, such as H, diffuses across the membrane to provide a source of H on the insertion side of the membrane, which is pos. biased with respect to a counter electrode so that a reactant mol. such as CO<sub>2</sub> is electrosorbed on the surface of the membrane. The electrosorbed reactant mol. chem. reacts with the surface H by the insertion reaction to form a reduced, **hydrogenated** product such as formic acid.

IT 7440-57-5P, uses and miscellaneous  
(**catalyst**, hydrogen formation, for hydrogen insertion  
reactions in electrolytic cell with transmissive membrane)

RN 7440-57-5 HCA

CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 7439-89-6, uses and miscellaneous  
(**catalyst**, reactant disson., for hydrogen insertion  
reactions through transmissive membranes)

RN 7439-89-6 HCA

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

IT 1333-74-0, reactions  
(insertion reaction of, in electrolytic cell with mobile atom  
transmission membrane)

RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 7782-44-7, reactions  
(reaction of, hydrogen insertion, in electrolytic cell with at.  
hydrogen transmissive membrane)

RN 7782-44-7 HCA

CN Oxygen (8CI, 9CI) (CA INDEX NAME)

O=O

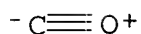
IT 124-38-9, reactions 630-08-0, reactions  
(reaction of, hydrogen insertion, in electrolytic cell with  
mobile atom transmissive membrane)

RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



IC ICM C25B011-00  
ICS C01C001-04; C01B021-16; C01B015-01  
NCL 204-73R  
CC 72-9 (Electrochemistry)  
Section cross-reference(s): 23, 45, 49, 66  
ST mobile atom insertion reaction; hydrogen insertion reaction  
transmissive membrane; **carbon dioxide** sorption  
transmissive membrane; formic acid prodn transmissive membrane  
IT Dissociation **catalysts**  
(for hydrogen insertion reaction)  
IT Electrolytic cells  
(for hydrogen insertion reaction in prepn. of reduced  
**hydrogenated** compds.)  
IT Synthesis  
(of reduced **hydrogenated** products by hydrogen insertion  
reactions through transmissive membranes in electrolytic cells)  
IT Gold alloy, base  
Silver alloy, base  
(**catalyst**, hydrogen formation, for hydrogen insertion  
reactions in electrolytic cell with transmissive membrane)  
IT Cobalt alloy, base  
Nickel alloy, base  
Osmium alloy, base  
Platinum alloy, base  
Ruthenium alloy, base  
(**catalyst**, hydrogen insertion, for hydrogen insertion  
reactions through transmissive membranes)  
IT Chromium alloy, base  
Iron alloy, base  
Tantalum alloy, base  
Tungsten alloy, base  
(**catalyst**, reactant dissocn., for hydrogen insertion  
reactions through transmissive membranes)  
IT Palladium alloy, base  
Titanium alloy, base  
(membrane, for hydrogen insertion reaction in cell for prepn. of  
reduced **hydrogenated** compds.)  
IT 7439-92-1P, uses and miscellaneous 7440-22-4P, uses and  
miscellaneous 7440-43-9P, uses and miscellaneous  
7440-57-5P, uses and miscellaneous 7440-74-6P, uses and  
miscellaneous  
(**catalyst**, hydrogen formation, for hydrogen insertion  
reactions in electrolytic cell with transmissive membrane)  
IT 7440-02-0, uses and miscellaneous 7440-04-2, uses and  
miscellaneous 7440-06-4, uses and miscellaneous 7440-18-8, uses  
and miscellaneous 7440-48-4, uses and miscellaneous

- (**catalyst**, hydrogen insertion, for hydrogen insertion reactions through transmissive membranes)
- IT 7439-89-6, uses and miscellaneous 7439-98-7, uses and miscellaneous 7440-25-7, uses and miscellaneous 7440-33-7, uses and miscellaneous 7440-47-3, uses and miscellaneous
- (**catalyst**, reactant dissochn., for hydrogen insertion reactions through transmissive membranes)
- IT 1333-74-0, reactions  
(insertion reaction of, in electrolytic cell with mobile atom transmission membrane)
- IT 7440-32-6, uses and miscellaneous  
(membrane, for hydrogen insertion reaction in cell for prepn. of reduced **hydrogenated** compds.)
- IT 7440-05-3, uses and miscellaneous 11140-68-4 12648-42-9  
(membrane, for hydrogen insertion reaction in cell for prepn. of reduced **hydrogenated** compds.)
- IT 50-00-0P, preparation 64-18-6P, preparation 67-56-1P, preparation 74-82-8P, preparation  
(prepn. of, by hydrogen insertion reaction in **carbon dioxide** in electrolytic cell with at. hydrogen transmissive membrane)
- IT 7782-44-7, reactions  
(reaction of, hydrogen insertion, in electrolytic cell with at. hydrogen transmissive membrane)
- IT 124-38-9, reactions 630-08-0, reactions  
(reaction of, hydrogen insertion, in electrolytic cell with mobile atom transmissive membrane)

L73 ANSWER 34 OF 36 HCA COPYRIGHT 2003 ACS on STN

96:88757) Fluid inclusion study and metallogeny review on gold deposits in western Hunan District, [China]. Ding, Biying; Yang, Yianzheng; Liao, Fengxian (Dep. Geol., Inst. Min. Metall., Changsha, Peop. Rep. China). Zhongnan Kuangye Xueyuan Xuebao (2), 114-20 (Chinese) 1981. CODEN: CKYPDO. ISSN: 0253-4347.

AB Homogenization temps., gas/liq. ratios, Eh and pH values, and concns. of the **gases** (H<sub>2</sub>O, CO<sub>2</sub>, CO, O<sub>2</sub>, H<sub>2</sub>, N<sub>2</sub>, CH<sub>4</sub>, C<sub>2</sub>H<sub>2</sub>, and C<sub>2</sub>H<sub>4</sub>), major ions (K<sup>+</sup>, Na<sup>+</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup>, F<sup>-</sup>, Cl<sup>-</sup>, and SO<sub>4</sub><sup>2-</sup>), and trace metals (Ni, Co, Sn, Be, Bi, W, Sb, Cu, Pb, Cr, **Fe**, Mn and **Au**) were detd. in fluid inclusions of the title Au ores and are consistent with ore formation by mesothermal-epithermal mineralizing fluids.

IT 124-38-9, occurrence 630-08-0, occurrence 1333-74-0, occurrence 7782-44-7, occurrence  
(in gold-ore fluid inclusions, mesothermal-epithermal fluid inclusions in relation to, of Hunan District, China)

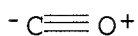
RN 124-38-9 HCA

CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)



RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)



RN 7782-44-7 HCA

CN Oxygen (8CI, 9CI) (CA INDEX NAME)



CC 53-2 (Mineralogical and Geological Chemistry)

IT 74-82-8, occurrence 74-85-1, occurrence 74-86-2, occurrence  
124-38-9, occurrence 630-08-0, occurrence  
1333-74-0, occurrence 7439-89-6, occurrence 7439-92-1,  
occurrence 7439-96-5, occurrence 7440-02-0, occurrence  
7440-31-5, occurrence 7440-33-7, occurrence 7440-36-0,  
occurrence 7440-41-7, occurrence 7440-47-3, occurrence  
7440-48-4, occurrence 7440-50-8, occurrence 7440-57-5,  
occurrence 7440-69-9, occurrence 7727-37-9, occurrence  
7782-44-7, occurrence

(in gold-ore fluid inclusions, mesothermal-epithermal fluid  
inclusions in relation to, of Hunan District, China)

L73 ANSWER 35 OF 36 HCA COPYRIGHT 2003 ACS on STN

66:70044 Understanding of the high-temperature oxidation of metals.  
Wagner, James Bruce, Jr. (Northwestern Univ., Evanston, IL, USA).  
AEC Access. Nos., TID-23268, 81 pp. Avail. Dep. mn; CFSTI, \$3 cy  
From: Nucl. Sci. Abstr. 1966, 20(22), 41458 (English) 1966. CODEN:  
AECAA6.

AB Investigations of doping semiconducting oxides are summarized.  
Li-doped NiO and CoO are discussed as examples of the doping  
process. Investigations are also reported on equil. vacancy concns.  
in the wustite phase field around a reported p-to-n transformation  
at 950-1250.degree.. Transformation mechanisms are discussed.  
Results of studies concerning oxidn. of Fe alloys contg. 0.59-1.06  
at.% Ti at 900-1100.degree. in CO<sub>2</sub>-CO mixts. are  
presented. An investigation to det. the mechanisms of oxidn. of Cu  
and ~~Cu-Au~~ alloys in CO<sub>2</sub> at 1000.degree. is summarized.  
Results of thermogravimetric and Seebeck effect measurements on  
Li-doped CoO crystals are included.

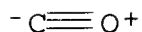
IT 630-08-0, reactions

(oxidn. of alloys and metals by carbon  
dioxide and)

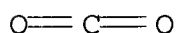
RN 630-08-0 HCA

CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)





IT 124-38-9, reactions  
 (oxidn. of alloys and metals by, and its mixts. with carbon monoxide)  
 RN 124-38-9 HCA  
 CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)



CC 71 (Electric Phenomena)  
 IT Gold alloys, containing  
 (copper-, oxidn. of, by **carbon dioxide**)  
 IT Copper alloys, containing  
 (gold-, oxidn. of, by **carbon dioxide**)  
 IT Titanium alloys, containing  
 (iron, oxidn. of, by **carbon dioxide**  
 -**carbon monoxide** mixts.)  
 IT Oxidation  
 (of copper, **gold-copper** alloys and **iron**  
 -titanium alloys in carbon oxides, mechanism of high-temp.)  
 IT Iron alloys, base  
 (titanium-, oxidn. of, by **carbon**  
**dioxide-carbon monoxide** mixts.)  
 IT 630-08-0, reactions  
 (oxidn. of alloys and metals by **carbon**  
**dioxide** and)  
 IT 124-38-9, reactions  
 (oxidn. of alloys and metals by, and its mixts. with carbon monoxide)  
 IT 7440-32-6, reactions  
 (oxidn. of iron contg., by **carbon dioxide** and  
**carbon** monoxide mixts.)  
 IT 7439-89-6, reactions  
 (oxidn. of titanium-contg., by **carbon dioxide**  
 -**carbon** monoxide mixts.)  
 IT 7440-50-8, reactions  
 (oxidn. of, by **carbon dioxide**)

L73 ANSWER 36 OF 36 HCA COPYRIGHT 2003 ACS on STN  
 10:2886 Original Reference No. 10:546c Work of the Physikalisch-  
 Technische Reichsanstalt in 1914. Warburg; Muller Zeitschrift fuer  
 Elektrochemie und Angewandte Physikalische Chemie, 21, 501-11  
 (Unavailable) 1915. CODEN: ZEAPAA. ISSN: 0372-8323.  
 AB cf. C. A. 9, 3148-51. Radiation measurements: improvements in the  
 methods The investigations of vacuum radiation were continued, and  
 the following improvements proposed: (1) To det. constancy of temp.  
 of the vacuum radiator and of other cases in which the  
 thermoelectric method is not applicable, a special form of bolometer

(Haltebolometer or Mittelblockbolometer) is used. The instrument is set in a larger water bath so that the furnace radiation must penetrate a greater H<sub>2</sub>O layer, the bath being kept at const. temp. by an elec. thermoregulator. (2) The formula previously reported (C. A. 7, 3700) for calcg. spectral intensity measurements with the mirror spectrometer was based on expts. with freshly silvered mirrors; this is not exactly correct as the reflectivity diminishes with the age of the mirrors. In a new series of expts. on the reflectivity of the mirrors, the wave lengths were measured by the method of Hagen and Rubens. Determination of the constant  $c$ . Applying the above improvements to the methods previously used (C. A. 7, 3700), new detns. of  $c$  were made with: (1) the vacuum-carbon radiator between the m. p. of Au and 1400.degree., and the m. p. of Au and 1700.degree.; (2) the Lummer-Kurlbaum open radiator between m. p. of Au and 1400.degree.; (3) the L.-K. model with linear dimensions of double size, but with relatively smaller opening of the inner screen, between same temp. limits. The new expts. show a better agreement among themselves than the old and give a smaller value to  $c$ , to be published later. All expts. were made with the new quartz prisms. Recent expts. of Paschen show deviations from the Carvallo dispersion formula in the 5th decimal place of the refraction exponent sufficient to make changes of almost 1% in the value of  $c$ . Temperature determinations according to the Wien displacement law and the Stefan-Boltzmann law Using the large L.-K. model, detns. were made at the same temp. according to the Wien law and according to the Stefan-Boltzmann law; the diam. of the furnace opening was increased from 5 to 10 mm. and the bolometer was placed in the center of a reflecting Ni hemisphere. Under these conditions the temp., detns. by both methods based on the Carvallo dispersion curve were almost in complete agreement. Light unit. A rational light unit can be obtained only through vacuum radiation, holding the radiator at a temp. of about 2000.degree.. Expts. have been initiated with the vacuum-C radiator, holding the temp. const. with the improved bolometer. For reproducing the temp. the method of Lummer and Kurlbaum was used in which a definite reduction of the total radiation is effected by absorption. For this a 2 cm. thick layer of a 10% K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> soln. between quartz plates was used. The light radiation could be reproduced up to 0.4%. Further work is in progress. Energy law of photochemical processes (Warburg). See C. A. 9, 883, 2348, 3149. bsorption of ultraviolet radiation See C. A. 8, 613; 9, 2480, 2836 Measurement of  $\epsilon$ ./ $\mu$ . (Gehrcke and Janicki). Further work is reported on the cathode dusting method. Metal plates of Pt, Au, Cu, and Zn were subjected to the rays of a Hg quartz lamp in vacuo and studied to det. the reproducibility of the potential charges of the plates. The charges were reproduced only when the plates were thoroughly "cleansed" by previous cathode dusting. The potential charge depends mainly upon the gas in which the dusting has been effected and only slightly upon the metal. After dusting in H the highest potential was found, viz., 2.44 V. for Pt, Au, Cu; 2.62 v. for Zn. Dusting in H<sub>2</sub>O vapor gave lower and less const. values of 1.8 to 2.3 v.; in He the lowest value (1.8 v.) was obtained. These potentials were reproducible and stable for

hrs., as long as the vacuum was held const. by liquid air. It was immaterial whether liquid air or liquid H, with or without coconut charcoal, was used in producing the vacuum. No reproducible potentials could be obtained with Al. Light emission of metal vapors in the glow discharge (Janicki and Seeliger). In the emission spectra of Cd, Zn, Mg, Pb, Al, Sn, Ag and Si there is a parallelism on the one hand between sparks and negative glow, on the other between arcs and positive columns; Te shows no such analogy. Expts. with Zn and Cd in externally heated Geissler tubes with inner electrodes confirmed the results with these 2 metals. Testing of radioactive preparations (Geiger, Bothe and Janicki). The total content of 395 strongly radioactive preps. examd. corresponded to about 8230 mg. Ra element (including 49 meso-Th preps. with a Ra equiv. of 1181 mg.); 102 preps. at time of examn. were not yet in radioactive equil.; 13 feebly radioactive preps. tested contained amts. of Ra of the order of magnitude of  $10^{-5}$  to  $10^{-4}$  mg. Ra element per g. of substance. Apparatus for testing feebly radioactive preparations (Bothe). See C. A. 9, 3026. Theory of the normal elements (von Steinwehr, Kohnstamm and Cohen) (Wied. Ann. 65, 344(1899)) and Holsboer (Z. physik. Chem. 39, 691(1902)) have reported a transformation point at 15.degree. for  $3\text{CdSO}_4 \cdot 8\text{H}_2\text{O}$ ; the work and conclusions of these authors are critically discussed, calcns. from their data giving a much lower temp. than 15.degree.. New measurements were made of the differential heats of diln. of  $\text{CdSO}_4$  solns. and the temp. coefficients of this heat tone calcd. From these data and older values the theoretical heat of soln. and its temp. coeff. were computed; from these 2 magnitudes the temp. of the change of sign of the theoretical heat of soln. and the minimum soly. agree to +3.degree. with the soly. expts. of Mylius and Funk (Ber. 30, 825(1897)). In the calcn. of the chem. energy the new values for the e. m. f. of the elements were used (electrochem. equiv. of 96494 (instead of 96540), elec. equiv. of heat = 0.2389). The results (47252 cal. calorimetrically and 47427 cal. electrically) show better agreement than earlier values. Calorimetric detns. of the temp. coeff. of the chem. energy of the elements gave +19.45 cal./degree; electrical detns. using the temp. formula of Jaeger and Wachsmuth for the Weston element gave +17.44 cal./deg. The Wolff formula gave +21.10 cal./deg. This shows that Cohen's criticism (C. A. 5, 1014) of the Jaeger temp. formula is not tenable. Cf. C. A. 8, 3146; 9, 3149. Mercurous sulfate (v Steinwehr).  $\text{Hg}_2\text{SO}_4$  is prepd. in large amts. for normal elements by E. de Haen, Hannover, under the supervision of the Reichsanstalt. The salt is kept under a satd. soln. of  $\text{CdSO}_4$  (cf. Warburg, C. A. 9, 1007). Silver voltameter (Jaeger and v. Steinwehr). A note describing briefly the different forms of Ag voltameter and calling attention to the work set forth in other publications (cf. Rosa et al., C. A. 8, 3154). Mercury resistance thermometer: change of resistance of Hg between 0 and 100.degree. (Jaeger and v. Steinwehr). See C. A. 8, 2297; 9, 749. Theory of mercury rectifiers (Jaeger). The oscillographic curve for electrolytic and Hg rectifiers has been investigated with a view to detg. the "minimum potential" which must be overcome. Current and voltage

curves of Hg rectifiers in different combinations with ohm resistance, capacities and inductances are calcd. and explained with figures. Cf. Schulze, C. A. 9, 24, 24, 1007. Weak-current laboratory See normal elements, C. A. 9, 3150. Electrical measuring technics laboratory (Feuszner). A description of a new lab. and its equipment. Comparison of platinum and helium thermometers below -193.degree. (Henning) The work previously reported (cf. C. A. 7, 2892) has been continued. Different resistance thermometers were compared with a He gas thermometer in baths of liquid air and liquid H, which boiled under normal or reduced pressure. For the intervals 80.degree. and 62.5.degree., and 20-3.degree. and 16.4.degree. abs. temp. the resistance ratio (Pt thermometer No. 30)  $R = r/r_0$  as a function of the abs. temp. T may be calcd. by the empirical equation  $\log (R - 0.0038) = -1.71496 + 0.76176 \log T - (34 - 985/T)$  with an accuracy of about 0.02.degree.. This formula has not been tested for the interval between T = 62.5 and 20.3.degree.. With Pt wires of same m. p. as No. 30, the equation holds with approx. the same const. (cf. Henning, C. A. 9, 3148). The quadratic reduction formula for R of different thermometers held above -193.degree. (at b. p. of O and at b. p. of CO<sub>2</sub>) regardless of the variety of Pt; at lower temps. it does not suffice for all the varieties of Pt, e. g., 2 varieties of Heraeus very pure Pt at the b. p. of H gave R at T = 20.3.degree., 0.0060 and 0.0082. Boiling point of hydrogen (Henning) The normal b. p. of H was detd. by immersing a He thermometer directly in the boiling liquid. The results were the same whether the liquid was stirred or not. Measurements agreeing within the limits of observation (0.02.degree.) with 2 different fillings of the gas thermometer (initial pressure  $p_0 = 740$  mm.) gave the normal b. p.  $t = -252.797$ .degree., reduction to 760 mm. being calcd. by the coeff. of Onnes,  $dt/dp = 0.005$ .degree. per mm. Applying the correction calcd. by Berthelot's method (+0.004.degree.) for the thermodynamic scale the normal b. p. on this scale  $t = -252.79$ .degree.. This result is not final as the thermal coeff. of expansion of the gas thermometer vessel (Jena glass 59III) was based on a value which by extrapolation gave an equation holding only to -193.degree.. Onnes and Keesom. in 1913 reported the normal b. p. of H on the thermodynamic scale = -252.76.degree.. Comparison of different gas thermometers (Hennin). Const. vol. H, He, and N thermometers were indirectly compared with one another by means of Pt resistance thermometers. The results together with previous measurements at 445.degree. in which A thermometers were investigated, are reported in a table, the He, N, or A thermometers giving higher readings than the H. The results were calcd. by the formula  $t_i - t = P_0(T_c^3/P_c) 10^{-8} [t(t-100)/(t + 273)]$ , which according to the Berthelot equation of state, gives the temp. difference  $t_i - t$  of the thermodynamic scale ( $t_i$ ) against the scale of a gas thermometer of const. vol. ( $t$ ) at the initial pressure  $p_0$ .  $T_c$  and  $P_c$  are the abs. critical temp. and press. of the gases. The results show that the B. equation does not present with sufficient accuracy the deviations of the different gas thermometers within the observed temp. range. Measurements with platinum thermometers in Leiden and Teddington (H.

Schultze) Three Pt thermometers of the Reichsanstalt were taken to Onnes' laboratory at Leiden and to the Natl. Physical Lab. at Teddington. In Leiden the resistance thermometer No. 35 (Pt exceptionally pure) was measured at the temp. of liquid H, which boiled under reduced pressure between 20.3.degree. and 14.7.degree. abs. The temp. was detd. from the vapor pressure of H, which, according to the measurements of Onnes and Keesom, is a function of the temp. measured in the thermodynamic scale. Measurements with the same instrument at the Reichsanstalt gave  $R = 0.006006$  at  $T = 20.28$ .degree. (He scale); by interpolation of the Leiden observations this value of  $R$  corresponds to 20-33.degree. (0-05.degree. higher). Aside from exptl. difficulties this difference is explained by the difference of the temp. scale of the Leiden lab. and the Reichsanstalt, O. and K. using a value for normal b. p. of H 0.03.degree. higher. Harker in the Natl. Physical Lab. has tested Pt thermometers Nos. 10 and 18 at the b. p. of S. The measurements were made with 2 b. p. app., one of Fe, the other of glass. The Reichsanstalt measurements were made in a glass boiling-tube, the av. results of a series of concordant measurements being reported. The results of the 2 institutions show good agreement. Specific heats of gases at low temperatures (Heuse) The sp. heat. of A at a pressure of 1 atm.: at + 20.degree. = 0.1263 g. Cal. 15/g. degree, at -180.degree. = 0.1317 g. Cal. 15/g. degree. From Berthelot's equation for the ratio of the sp. heats in ideal gases,  $x$  at 20.degree. = 1.651. The deviation of this value from that (1.667) for monoatomic gases by the kinetic gas theory is of the same significance as was observed with He (cf. C. A. 9, 3148). Equation of state of **gases** (Holborn and H. Schultze) Cf. C. A. 10, 416. The pv value for pure He was detd. at 0.degree., 50.degree., and 100.degree. for pressures of 19 and 38 m. of Hg. Within these limits the isothermals are rectilinear; the values of Onnes at 0.degree. and 100.degree. within this pressure range show deviations up to 0.1% from the rectilinear. Expts. were interrupted by the war. In order to check the pressure measurements within an accuracy of 0.03%, the pressure balance, which had been compared with a Hg manometer at 16 atm., was tested for higher pressures. For this purpose 2 similar balances, standardized as above, were compared with one another at pressures up to 200 atm., showing a variation with the pressure and necessitating a direct comparison with the Hg manometer which is outlined. Specific heats of gases at high pressure (Holborn and Jacob) Expts. on the av. sp. heat of air between 20.degree. and 100.degree. were extended to 300 atms., but the outbreak of the war has interrupted the work. Liquefaction of hydrogen and helium (Meissner) Improvements in the plant for the liquefaction of gases have reduced the amt. of liquid air used for precooling in the liquefaction of H from 2.5 to 1.75 l. per hr. During the yr. 33 l. of liquid H were produced. According to Onnes the production of a few hundred cc. of liquid He requires 25 l. of liquid H, the production of which requires about 75 l. of liquid air. An investigation is in progress looking to a simpler and more economical process. Expts. without definite results have been made on the liquefaction of H without precooling with liquid

air, based on the use of the external performance of the compressed H. In the liquefaction of He the precooling with liquid H cools the He to a little below the inversion point for the Joule-Thomson effect, so that the latter is very small; an improvement appears possible by the use of the external performance of the compressed He, e. g., on a turbine as suggested by Rayleigh. The testing of laboratory and other thermometers (Meissner) (normal, meteorological, calorimeter, etc.) is reported, number of tests made and accuracy required being given. Seven per cent. of thermometers tested were rejected. Comparison of mercury with platinum thermometers between 0.degree. and 100.degree. (Holborn and Scheel) A series of Hg thermometers were compared among themselves and with 3 Pt resistance thermometers in the interval 0.degree. to 100.degree.. Two thermometers of the verre dur of the Internatl. Bureau, 2 inclosed scale thermometers of Jena glass 16III and rod thermometers of Jena glasses 16III and 59III, were tested. Results are reported in a table, the values agreeing for each temp. (20.degree., 40.degree., 50.degree., 75.degree.) within the limits of error of about 0.005.degree. for the 3 scales (internatl. H scale, testing lab. scale and the scale used in the radiation measurements above). Comparison of mercury and platinum thermometers between 100.degree. and 300.degree. (Hoffmann and Meissner) See C. A. 9, 2331. New thermometer glasses (scheel, Grutmacher and Moeller) The work is progressing, though not completed, owing to the personal supervision required in the factory and the time and care necessary in the calibration. Twelve normals of different glasses have been calibrated and compared; the softening temp. and expansion of some glasses were detd. dilatometrically; one glass is being tested for the manuf. of clinical thermometers. Electrical and optical temperature measurements (Hoffmann and A. Schulze) Tests reported on thermoelements, using 3 elements of Pt-(Pt-Rh) from 100.degree. to 1100.degree. as instruments of precision. Two elements of constantan-Cu and 1 element of constantan-Fe below 0.degree. were tested; 8 elements of constantan-Fe and 1 of constantan-W up to 800-900.degree. were tested, two of Ni-(Ni-Cr) up to 1100.degree.. A study of the behavior of thermoelements of the base metals on continued heating at high temps. in the elec. furnace showed that in elements consisting of strong tubes or rods the thermal force did not change more than 5.degree. to 10.degree.; such constancy can be attained only when the element, before being used for temp. measurements, is heated throughout its length in order to reduce any irregularities (lack of homogeneity). Elements of constantan-Fe, constantan-steel tube, and Ni-35% Ni steel withstood a temp. of 800.degree. for 250 to 300 hrs.; an element of Ni-66% Ni steel withstood 1000.degree.. Elements of Ni-C for an av. of 275 hrs. at a temp. of 1200.degree. did not change more than 10.degree.; Ni-(Ni-Cr) (10% Cr) at 1000.degree. for longer periods changed not over 10.degree.. The thermo-electric behavior of W, Mo, and Ta is being studied. Special tests (Moeller and Hoffmann) The heats of combustion of lamp filaments of W and W powder were detd. The m. p. (273.degree.) of Bi prep'd. in the lab. was detd. by sealing the

metal in a glass tube; the m. p. and solidifying point were detd. with a thermoelement. Chemical work. Preparation of pure metals (Mylius) The work of the Reichsanstalt has enabled German factories to produce the following metals of great purity: Hg, Ag, Au, Pt, Cu, Sn, Zn, Cd, Pb, Bi, Sb, Fe, Ni, Co, Ir, Rh, Ru, Os. The impurity of the factory products never exceeds 1: 104. The prepn. of pure Pt from  $\text{Na}_2\text{PtCl}_6$  was accomplished by Mylius and Foerster (Ber. 25, 665(1892)); methods of Pt analysis (cf. C. A. 9,419). The Pt of commerce always contains numerous impurities in small amts., e. g., Heraeus purest Pt contains traces of Ir, Pd, Au, Cu and Fe ( = 1:04 impurity). Readily detectable amts. of Pt, Ag, Sn and Zn are normally present in the pure electrolytic Bi, while Kahlbaum's purest Bi (in 1914) prepd. by chemical methods contained as impurities: Ag trace, Cu 0.001%, Pb and Fe traces (= 1:104-5). A table is given showing amts. of impurities in Bi from various sources. The sp. elec. resistance of Bi wire from Hartmann and Braun was found by Steinhaus and Werner to be 1.290 at 22.degree.; of Bi prepd. by Lenard's process (Ann. Physik. Chem. 39, 642(1890)) varies from 1.088 to 1.157. Groschuff's work on a commercial Sb shows the need for improved chemical methods. For the sepn. of Sb from its solns. it is suggested that one use the  $\text{H}_2\text{O}$ -decomposable, crystd. compd. of  $\text{SbCl}_5$  with HCl, which is pptd. by passing in HCl-gas. The impurities are concd. in the mother-liquor and then detd.

Kahlbaum's "technical" Sb contains as impurities Cu, Pb, Fe, Ni, Co, Sn, and As (impurity = 1:102); K.'s "pure" Sb is of higher purity, but the ratio of the impurities to Sb has not been established. Nickel and cobalt (Mylius and Huttner). Expts. on the purification of impure Ni and Co by the crystn. of the simple salts (nitrates, chlorides, sulfates, etc.) resulted more in the removal of impurities (Cu, Fe, Mn, Zn, etc.) than in the sepn. of Ni and Co, as the salts of the latter are very similar in soly. and readily form mixed crystals. For the complete sepn. and purification, complex compds. characteristic of i metal only must be used: for Ni the rose colored double nitrite  $\text{Ni}(\text{NO}_2)_2(\text{NH}_3)_4$ ; for Co the purpureo salt  $\text{Co}(\text{NH}_3)_5(\text{NO}_3)_3$ . The use of these and other salts is being studied. Platinum substitutes (Groschuff and Lenz) Wires of Pt-Ag alloys have been tested for use in incandescent lamps. Time expts. with such wires containing 25% Pt have been conducted with reference to the required "vacuum density."

CC 2 (General and Physical Chemistry)

=> d 174 1-5 ti

L74 ANSWER 1 OF 5 HCA COPYRIGHT 2003 ACS on STN

TI Apparatus for improving combustion efficiency of fuel in internal combustion engine and removing hazardous exhaust gas

L74 ANSWER 2 OF 5 HCA COPYRIGHT 2003 ACS on STN

TI The distribution of cobalt between alloy, matte and iron silicate slag at 1573 K

✓ X  
L74 ANSWER 3 OF 5 HCA COPYRIGHT 2003 ACS on STN  
TI The effect of temperature on nickel solubility in silica-saturated fayalite slags from 1523 to 1623 K

L74 ANSWER 4 OF 5 HCA COPYRIGHT 2003 ACS on STN  
TI The activity of iron in low-iron liquid (nickel + gold + iron) and solid (nickel + iron) alloys at 1573 K

X  
L74 ANSWER 5 OF 5 HCA COPYRIGHT 2003 ACS on STN  
TI Gas in the fusion of nonferrous alloys

=> d 174-1 cbib abs hitstr hitind

X  
L74 ANSWER 1 OF 5 HCA COPYRIGHT 2003 ACS on STN  
137:236774 Apparatus for improving combustion efficiency of fuel in internal combustion engine and removing hazardous exhaust gas.  
Goto, Susumu (ICI K. K., Japan). Jpn. Kokai Tokkyo Koho JP 2002266711 A2 20020918, 3 pp. (Japanese). CODEN: JKXXAF.  
APPLICATION: JP 2001-110620 20010306.

AB The app. includes a cylindric device (20 mm diam., 50 mm length) arranged inside the fuel tank for generating neg. ions for oxidn.-redn. reaction, to activate fuel by forming ultrafine particles for improving combustion efficiency and removing hazardous gases, like CO, CO<sub>2</sub>, hydrocarbon, NO<sub>x</sub>, etc. The device is made of Al, Mg, Au, Pt, Ag, Cu, Fe, Mn, Cl, etc.

IT 124-38-9, Carbon dioxide, processes  
630-08-0, Carbon monoxide, processes  
(app. for improving combustion efficiency of fuel in internal combustion engine and removing hazardous exhaust gas)

RN 124-38-9 HCA  
CN Carbon dioxide (8CI, 9CI) (CA INDEX NAME)

O=C=O

RN 630-08-0 HCA  
CN Carbon monoxide (8CI, 9CI) (CA INDEX NAME)

-C≡O+

IC ICM F02M027-02  
ICS F02M027-02; F01N003-08  
CC 59-3 (Air Pollution and Industrial Hygiene)  
Section cross-reference(s): 51  
IT 124-38-9, Carbon dioxide, processes  
630-08-0, Carbon monoxide, processes  
11104-93-1, Nitrogen oxide, processes